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THE IRON AGE

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THE IRON AGE

New York, May 20, 1926

ESTABLISHED 1855 VOL. 117, No. 20

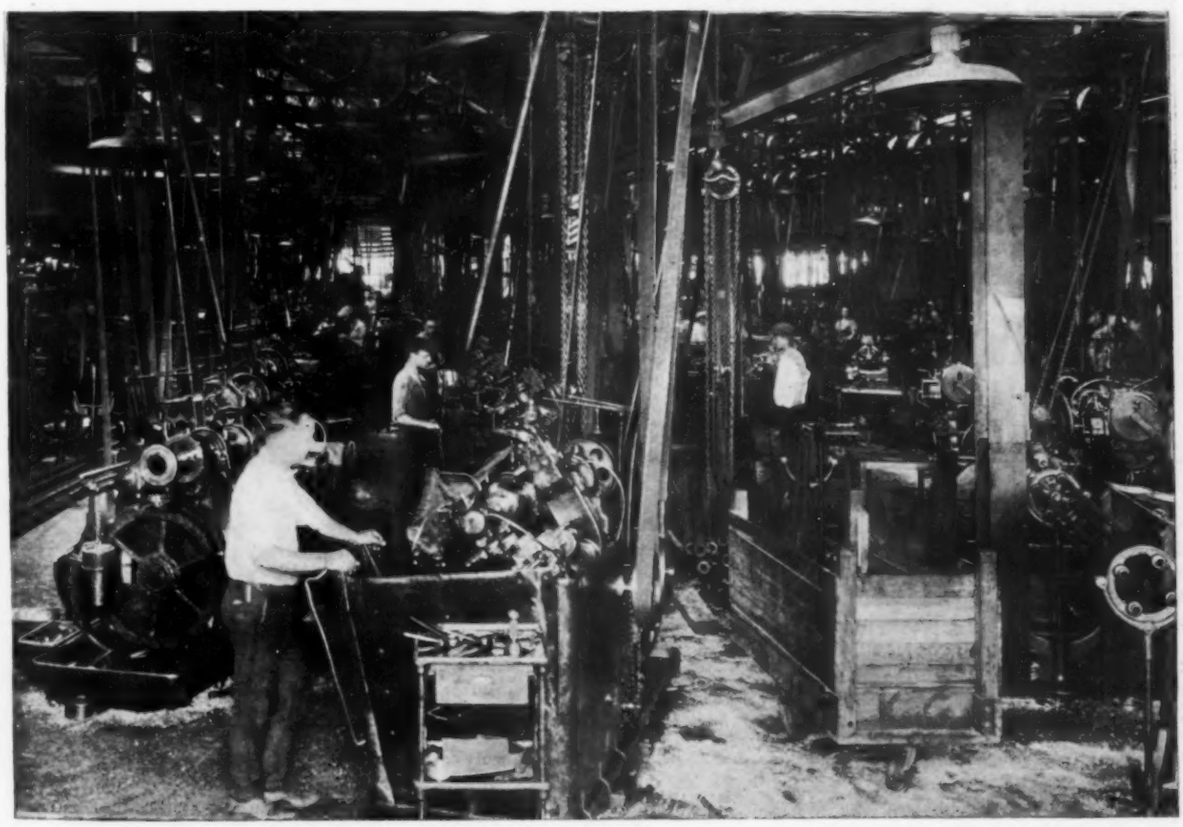
Better Volume with Fewer Men

Compensation by "Pay Unit" System Results in Higher Efficiency—Inventory Control a Feature

MATERIAL reduction in man-power, increase in the volume of output and decided improvement in the morale of employees have resulted at the plant of the Marmon Motor Car Co., Indianapolis, from a recent revision of production methods and from the inauguration of a "pay unit" system for compensating employees. The change in methods of production includes the arrangement of manufacturing equipment in parallel lines at right angles to the line of assembly, which permits all material to enter one side of the plant by means of a single delivery aisle. In this way the circuitous routing of material is avoided.

Stock piles at the head of the machine lines have been reduced to a minimum. They are visible and so grouped that they can be checked at any time. An abnormally large accumulation or a shrinkage below a safe level is noticeable almost immediately. Thus inventory taking has been simplified, so that a complete survey of materials can be made in half a day.

Machines in each department are grouped as closely together as possible in sequential relation. No workers nor mechanical conveyors are employed to deliver material from one operator to the next. Instead, the man at the beginning of the line goes to the stock pile and gets what he needs, his time being figured in the cost of production. After his machining work is com-



In This General View of the Machine Shop Will Be Noted the Proximity of Materials in Process to the Machines Working on Them. This is the starting end of several rows of machines through which the parts pass in straight lines, thus conserving handling labor and time and cutting down the number of employees

pleted, he places the material within reach of the next operator. Naturally, with such an arrangement, production has been so scheduled that material progresses through the department at a rate which has been determined only after long study. In fact, sub-assemblies, inspections and in some cases the finishing operations are introduced into the manufacturing sequence.

The proximity of machines in itself has permitted the cutting down of the number of employees. For example, there are 37 machine tools in the main bearings department; they are operated by eight men. All machines are single-purpose tools, with the exception of the automatics. The company has found it profitable to limit the function of a machine to one operation and to allow it to stand idle at times, rather than to widen the scope of its work in an effort to keep it in use constantly.

Experiments in adapting a certain machine to a specific job have been made, to eliminate any unnecessary employment of labor. The results have proved beneficial in reducing the cost of production. For instance, the lapping of crankcases is done on a drill, thereby effecting a saving equal to the pay of the eight men needed under the old method.

Although there is a receiving and inspection department at the entrance to the plant, 90 per cent of the raw material is delivered direct to the stock pile at the head of each department. Extra handling and unnecessary record keeping are therefore eliminated. All defective material in a department is placed each day on a salvage bench, where it is inspected by a salvage committee, consisting of representatives of the purchasing, inspection and engineering departments, the head of the salvage department and the foreman of the department visited. If the material fails to attain the proper standard, it is either returned to the maker or sent back to the shop to be repaired.

To prevent any unnecessary hauling, practically all heat-treating operations are performed before material is delivered to the shop. The location of the heat-treating department at the entrance to the plant is advantageous.

New Arrangement for Paying Men

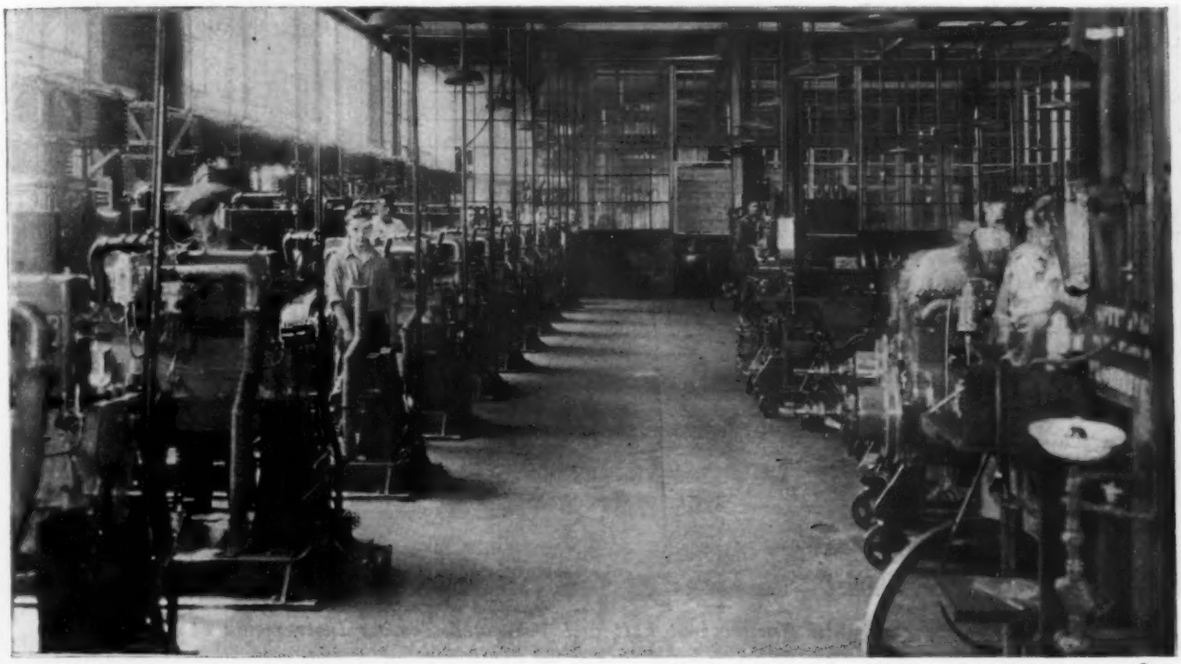
While the methods already cited have been important factors in increasing the efficiency of the plant and in lowering production costs, the unique feature is the plan for paying employees. However, it is so interwoven with the entire system of plant management that an exposition of the plan involves a description of the latter.

The "pay unit" system is based upon the idea that the efforts of workmen should be directed toward the ultimate object of turning out a complete automobile, not toward merely milling a certain number of crankcase castings each day. Therefore, the worker is compensated for his proportionate part in the cost of a completed pay unit which, for convenience, is a chassis or a motor instead of a finished automobile.

To simplify the method of payment and to create a sense of group responsibility, the pay unit consists of an entire group. For example, the steering gear group constitutes a single pay unit. The individual employee is interested not only in his particular job, but also in the completion of the greatest possible number of steering gears, because it is on the latter basis that he is compensated. All those involved in work in a single group or unit are paid in a group and are collectively responsible for the satisfactory character of their work.

Foremen have become group leaders instead of bosses. Their purpose is to see that the proper number of units is finished with a maximum amount of efficiency each day. Upon the completion of these units depends the group's pay. Hence the foreman, in effect, is safeguarding the welfare of his men as well as acting as a supervisor for the company.

Ingersoll Miller at Work on a Gang Set-Up in the Marmon Plant. The general design is like that of a planer, with tools operating from a bridge while the heavy bed passes underneath



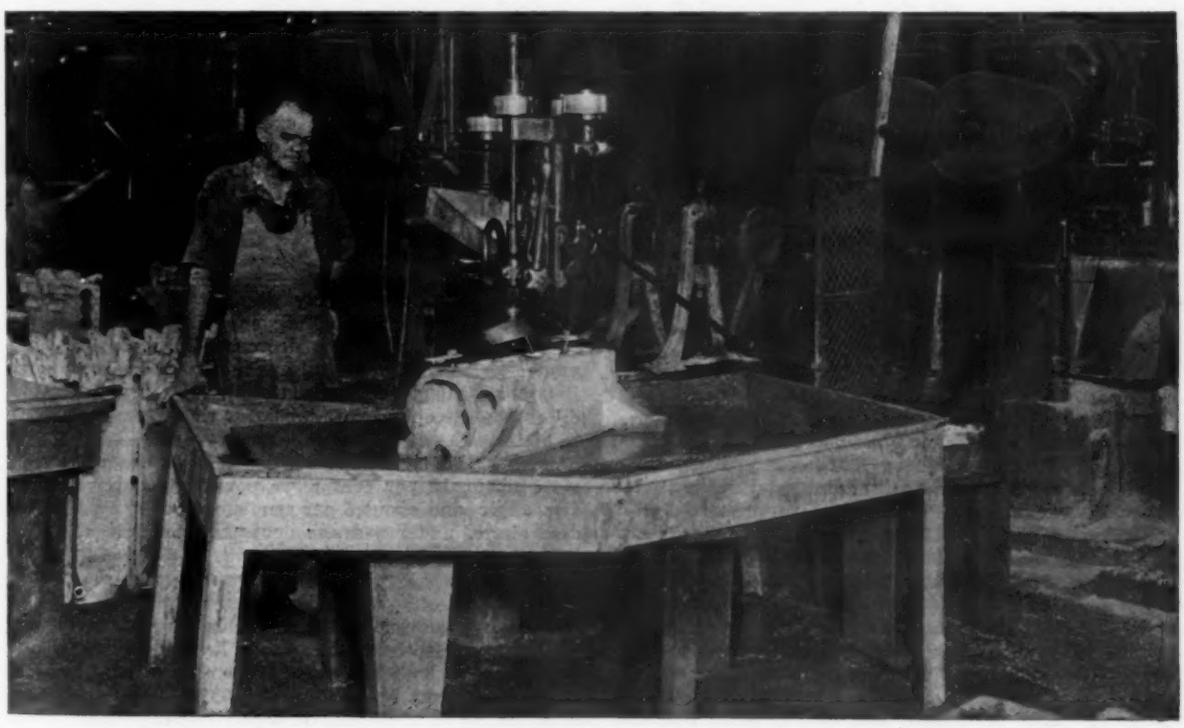
Dynamometer Test Room, Where Completed Engines Show Their Power

Each pay unit is responsible for the perfection of the work which it produces. If upon inspection a part is found to be defective, it is returned to the unit from which it has come and is repaired, the men receiving no pay for the repair work. If it is necessary to send the part to another unit, the repair expense is charged to the unit which produced it originally. Furthermore, if the part is so defective that it is a total loss, the pay unit is penalized by failing to receive compensation for its labor.

Unless there is an even flow of material through the plant the possibility of a temporary suspension of activities in certain pay units and in entire departments is great. The slowness of one unit in turning out the required number of parts, or carelessness which results in the rejection of parts when inspected, are factors which have been almost entirely eliminated, because each employee now takes pride in his work and also realizes that laxity upon his part will bring upon him the disfavor and even the condemnation of his fellow workmen.

Keeps the Men on Their Toes

The average efficiency of each worker has increased under the new plan. The employees in each group were



Lapping Crankcase on a Drill Press, Thereby Effecting a Saving Equal to the Pay of Eight Men Needed Under the Old Method

Heat Treating Department, With Furnaces at Left and Tools and Testing Instruments at Right. Raw materials and parts in process are handled here

eager to have companions capable of maintaining a high standard in their daily duties. They were intolerant of the man who lagged on the job or who was not equal to the task assigned him. Sometimes the members of a group would suggest to the factory superintendent that their job could be done by 14 instead of 15 men. They then would intimate that a certain man, not doing his share, should be dismissed.

Of course, under such circumstances, rigid supervision had to be exercised to see that that particular employee was not being "railroaded" out of the shop by those who had taken a dislike to him. However, it was discovered that in most cases the judgment of the men was correct and that they quickly had spotted the shirker or the inefficient. Thus, each man, perhaps unconsciously, became the personal representative of the management to see that his fellow workers performed efficiently the tasks for which they were being paid.

Installation of the new "pay unit" system and the rearrangement of the plant have resulted in many practical economies. Instead of 120 stock clerks there are now 30. Consolidation of the tool crib and tool room stores has dispensed with two men. Other minor employees have been eliminated.

Approximately 40 factory trucks, formerly in use, have become unnecessary because of the condensation of manufacturing operations into one plant. The work of the time office is but a fraction of what it formerly was, now that each pay unit is compensated in a lump sum.

Moreover, the workers themselves, by keeping a close check on their fellow employees, have cut nonproductive labor down to a minimum. They take pride in caring for their equipment and in keeping the shop clean, thereby removing the necessity for a large corps of sweepers and other laborers. The adaptation of certain machine tools to certain kinds of work has been another important factor in reducing the number of employees and in increasing output.

Among the most beneficial effects has been the changed attitude of the workers. No longer are their interests centered in the narrow confines of their own jobs. They now have a proprietary feeling, kindled by the sense of responsibility which is theirs under the pay unit system. A premium has been placed upon initiative, ability and the exertion of physical effort. They have a real conception of their part in producing a finished automobile and of the responsibility which the management has confided in them.

Power Transmission by Belts

Capacity as Affected by Angularity of Drive—Horizontal Position Better Than Vertical

Experiments made in the laboratories of Cornell University, Ithaca, N. Y., by R. F. Jones, research engineer, on behalf of the Leather Belting Exchange, 119 South Fourth Street, Philadelphia, are reported in a pamphlet just issued. This report covers determination of the relative power transmitting capacity of belts on vertical, angular and horizontal drive. It was found that the vertical belt transmitted about 12 per cent less power than the horizontal under average conditions. The percentage difference varies with the distance between centers. A given increase in tension increases the capacity of a vertical belt more than of a horizontal belt. A vertical belt is thus more sensitive to tension, and ought to be tightened oftener to maintain uniform capacity.

At high tensions vertical, angular and horizontal drives perform more nearly alike; at low tensions they differ widely in transmitting capacity. The capacity for transmitting power decreases progressively as angles above the horizontal are increased above 45 deg. Between 45 deg. and horizontal there is practically no difference, except at low tensions, when the horizontal is better.

Using the tight side of the belt as the underside gives about 12 per cent more power on a drive at 45 deg. angle, and about 6 per cent more power on a 67½-deg. angle, under average operating conditions.

Domestic sales of oak leather belting in April are reported by the Leather Belting Exchange at 359,298 lb., valued at $609,369, or $1.70 per lb. This shows a sharp drop from March sales of 397,207 lb., valued at $678,828, or $1.71 per lb. It is considerably lower, also, than the total for April, 1925, at 380,443 lb., valued at $663,493, or $1.74 per lb. The reports represent about 60 per cent of the total product.

Improving Low-Grade Iron Ores

Beneficiation of Lake Superior and Minnesota Ores Important—Chromium Plating, Welding and Aluminum Bronze Also Discussed at Chemical Equipment Exhibition

THAT the future of the iron ore supply of the Lake Superior district depends on the development of processes by which a tremendous tonnage of low-grade ore can be beneficiated economically to take the place of high-grade ore when the supply of the latter is exhausted, was discussed in two papers presented at an iron ore session, one of several technical meetings held by the Associated Technical Societies of Cleveland, May 10 to 15, in connection with the second chemical equipment and process engineering exposition held by the Association of Chemical Equipment Manufacturers, Inc. The speakers pointed out that there have been important developments in methods of ore beneficiation the past few years, but they indicated that the economical preparation of low-grade reserves sufficient, perhaps, to last for centuries, converting them into merchantable ore, is still an unsolved problem. Attention was called to the large amount of research work in the treatment of lean ore that is now being conducted, and some of the interesting results obtained in experiment stations were outlined.

Technical sessions of interest to the iron and steel industry included, in addition to the one on ore, a session on corrosion and a part session on welding.

Beneficiation of Lean Iron Ores

"THE Economic Aspects of Lake Superior Iron Ore Beneficiation" was discussed in a paper by M. C. Lake, geologist M. A. Hanna Co., Cleveland. Mr. Lake was unable to be present and his paper was read by Prof. A. T. Sweet of the Michigan School of Mines. Mr. Lake's paper gave data showing the depreciation of Lake Superior ore reserves and outlined what has been done in the way of beneficiation. He said that if the demand for Lake Superior ore continues to increase as it has since 1900, which is not expected by many, that district must produce 75,000,000 tons annually by 1944. If, however, the demand settles down to the average of the past 10 years, the future requirements will average 53,000,000 tons per year. The reserves of high-grade ore in the Lake Superior district are insufficient to maintain indefinitely a production equal to the rate of recent demand, unless new deposits are developed.

On the subject of beneficiation, Mr. Lake said that the past 10 years have seen an important development in the methods of beneficiation. In Minnesota 9.1 per cent of the ore was beneficiated in 1919, 24.4 per cent in 1924 and 35 per cent in 1925. Of 7,706,000 tons beneficiated in 1924, 4,852,000 tons was washed and 2,375,000 was crushed and screened. This district has a large tonnage of loose sandy ores susceptible to low cost methods of beneficiation. At present the only beneficiation in Michigan is by crushing and by picking rock and lean ore from stock piles. Several attempts at beneficiation on a commercial scale have been made in Michigan and Wisconsin, but none are operating at present.

There is a tremendous reserve of low-grade ore in the Lake Superior district averaging about 35 per cent iron, none of which can be marketed today at a profit, and the extent of its ultimate utilization will depend on how much the customers can afford to pay for this ore. It is still to be determined whether the highest grade of lean ore, which can be mined cheaply from open pits, can be beneficiated cheaply and in competition with better ores. The estimate of the amount available for open pit mining is 12,206,000,000 tons. If 50 per cent of this is excluded because of adverse factors, there is still available 6,000,000,000 tons averaging over 35 per cent iron that could be mined by open pit methods and, if it could be concentrated in a ratio of two to one, it would provide 3,000,000,000 tons of iron or concentrates and greatly extend the life of the Lake Superior district.

There is a large deposit of titaniferous magnetite in Minnesota which may some time be an important source of iron ore, the separation of which would have to be done by some chemical or metallurgical process. The plant at Babbit, Minn., for treating low-grade magnetic ore, of which large tonnages are available, is idle, because with the cost of beneficiation it cannot compete with high-grade ores at present prices. Mr. Lake discussed the work that has been undertaken at state expense to investigate the beneficiation of lean ores. The Michigan College of Mines will conduct a research on the beneficiation of non-magnetic ores as well as high-grade ores containing obnoxious metals such as sulphur.

Treating Low-Grade Lake Superior Ores

The future importance of the Lake Superior ore district, according to the speaker, will depend upon the development of processes which can treat low-grade ores profitably and sell them at a low cost per unit. If the Lake Superior district is to continue to market its ore at a profit, it must meet the rising costs and spend large sums for exploration and development of processes of beneficiation, said the speaker. The economic aspect of the situation requires an investigation to determine how much can be spent on Lake Superior ore beneficiation and bring a profit to the producer. The problem of the future supply of Lake Superior ore cannot be dismissed by the optimistic statement that, when the high-grade reserves are exhausted and the lower grade ores are needed, the latter will be beneficiated.

W. G. Swart, mining and metallurgical engineer, Duluth, said that the probable ore reserve of the Lake Superior district is 2,500,000,000 tons, or a 50-year supply, and the assured supply is 1,500,000,000 tons, or sufficient for 30 years. He showed charts of the production curve of 11 exhausted mines in the Mesabi district. The peak production in that district in his opinion would probably be in 1940 to 1944, after which there would be a steady decline. Twenty-two washing and concentrating plants in the Mesabi district indicated the tendency toward beneficiation. He pointed out that some blast furnaces in making production records use high-grade Old Range ores and concentrates and another used sintered ore. Washing, in his opinion, is the most important of the beneficiation methods. He predicted an increase in the use of the jigging process which at the start was more likely to be sup-

(*Continued on page* 1474)

Unusual Tunnel Annealing Furnace

Car-Type Continuous Kiln 210 Ft. Long Anneals 28 Tons per Day—Runs on 120-Hr. Cycle

The Tunnel Is Open on the Sides to 14 In. Above the Floor, the Tops of the Cars Forming the Bottom of the Kiln, and a Pit Is Provided the Full Length of the Track. Air circulates around the car wheels, which are thus kept cool, and repairs can be made beneath the cars while in the kiln and without any interruption in operations. Burner outlets show on each side. This view of the kiln was taken from the charging end.

A TUNNEL-TYPE continuous annealing furnace of a new design for annealing malleable castings was placed in operation early in April by the Northwestern Malleable Iron Co., Milwaukee. This furnace is of the open fire or semi-muffled type, in this respect differing from other tunnel kiln annealing furnaces, which are of the fully muffled type. The furnace was designed and built by Holcroft & Co., Detroit.

An outstanding feature of this furnace is in the design of the tunnel, which, instead of being built solid from the floor, is open the full length on both sides from the bottom of the sand seal to the floor level. The car tops form the bottom of the kiln. The sand seal extends the full length of the kiln on each side.

The side of the kiln rests on girder and plate members extending above the floor, leaving a 14-in. open space along both sides of the kiln extending down to the floor. This permits a free circulation of air under the cars, so that the wheels and bearings are exposed to the atmosphere and there is no need of water or air-cooling pipes.

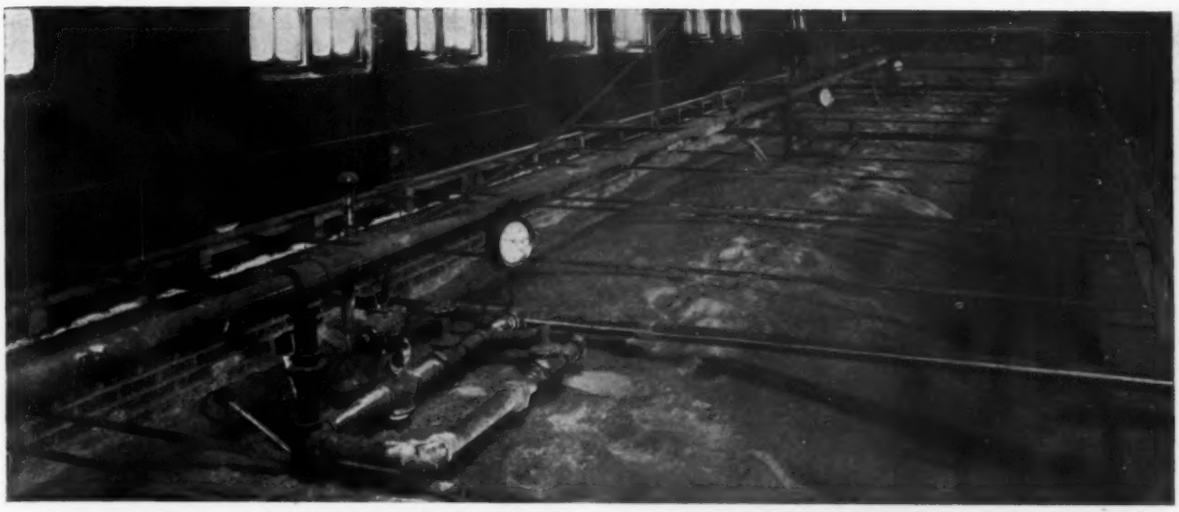
In addition to providing for the circulation of air under the kiln, a pit with openings at both ends extends the length of the kiln beneath the car track. This permits access to the bottom of the cars, so that bearings or wheels can be replaced or other repairs made to the cars without shutting down or interfering in any way with the operation of the kiln. An axle can be jacked up and repairs completed before the time comes for the car to be moved along the track by the charge of another car into the kiln. The cars are well insulated and, with the air circulation beneath the kiln, it is stated that the temperature of the car bearings never exceeds 120 deg. Fahr. Keeping the bearings comparatively cool is expected to prevent much bearing trouble.

This kiln was designed for annealing 25 tons of castings per day. Other tunnel-type continuous annealing furnaces have been built with considerably larger capacity, but the builder of this furnace was of the opinion that a kiln of 25 tons capacity would be more practical than a larger kiln that perhaps could not be operating at capacity except during periods of peak production. While designed for a daily capacity of 25 tons, its output since its operation started has averaged 28.8 net tons of good castings. Its fuel consumption has been 2600 cu. ft. of gas per gross ton of iron.

Contrary to the rather common experience when equipment of a new design is placed in operation, it is stated that no troubles have developed in the operation of the kiln, and that it has turned out good iron from the start. The kiln is used largely for annealing miscellaneous railroad car castings and rear axle housings for automobiles.

The over-all length of the kiln is 210 ft., the length of the kiln itself being 180 ft. At each end is a vestibule through which cars are charged and discharged. The height of the tunnel is 7 ft. 6 in. above the car top. The tunnel is divided into a 20-ft. preheating zone, a 75-ft. heating and soaking zone, and an 85-ft. cooling zone.

The tunnel is built of fire brick and insulated brick and is entirely inclosed in a structural steel I-beam and plate frame. The pit beneath the tunnel is 6 ft. deep and 3 ft. 6 in wide and has concrete walls and floor. Above the pit are 6-in. channel cross ties, at a level with the top of the track rails. The outlet flues are



Top of the Kiln, Showing Piping From the Main Supply Line to Manifold and Automatically Controlling Valve for Each Manifold

located near the charging end, all products of combustion passing up through a stack at that end.

The cars have structural steel sub-structures with cast iron tops and a superstructure of fire clay blocks and insulating brick. They are approximately 7 ft. wide, 6 ft. long and 3 ft. high. The wheels have roller bearings. The track gage is 4 ft. 2½ in.

Operation of Furnace

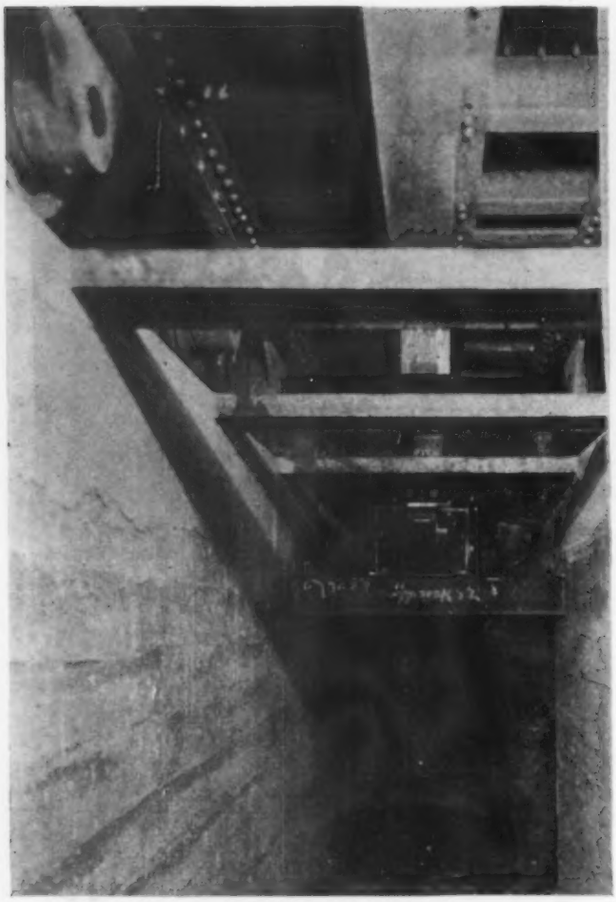
No packing is used, the castings being placed in the pots loose. The pots are of standard design, 20 in. high, and have trunnions at two diagonally opposite corners to permit lifting with a crane. The average weight of the castings placed in each pot is 400 lb. A car is loaded with 24 pots in six stacks, four pots high. The loaded car weighs about 22 tons, of which 5 tons is in castings.

A loading and unloading track extends along one side of the kiln and pots are handled with a 3-ton e'ectric traveling crane built by the Harnischfeger Corporation, Milwaukee. There is a short transfer track at each end, by means of which a Fordson tractor moves cars outside the kiln. Used for both pulling and pushing cars, the tractor has a steel plate bumper at the front end, which permits its use for pushing. Before entering the kiln the cars pass through a height gage conforming to the clearance inside the tunnel, to avoid danger of cars being loaded higher than the top of the kiln.

After a car is pushed into the vestibule the rolling curtain vestibule door is closed. The door in the kiln then is opened and the car is pushed into the kiln by a hydraulic-type ram supplied by the Oilgear Co., Milwaukee. A car being pushed into the tunnel pushes the other cars along. A kicker cylinder under the track provided near the discharge end, pushes the end car out onto the transfer, thus doing away with the necessity of using pinch bars. The Oilgear system is used also for operating the charging and discharging doors.

Temperature at the charging door, in the preheating zone, is 650 deg. Fahr. This comes up to a maximum of 1700 deg. in the soaking zone and at the discharge end of the cooling zone it is approximately 900 deg. The first manifold, starting at the charging end, is set for 1500 deg., the second for 1650 deg., and the last two each for 1700 deg. Temperature controls are all located in the heating and soaking

Car Entering the Kiln at Charging End, Being Pushed In by a Ram. (Above) The vestibule door is left raised to show the operation. At right, the Oilgear ram equipment. The horizontal cylinder operates the car; the vertical cylinder, the door between vestibule and kiln



In the Pit, Showing Workman Standing Beneath Cars. This picture shows also the kick-off used in pushing cars from the kiln at the discharge end

zones. Actual readings of the temperature of the iron inside the pots can be made with a portable pyrometer.

While the kiln is being operated on a 120-hr. cycle, there is a possibility that the length of the cycle will be reduced. Although designed for charging five cars a day, six cars are being charged in the kiln daily—one every 4 hr. Forty-eight cars are used, of which 30 are in the kiln and 18 are on the loading and unloading line. Of those in the kiln, three are in the preheating zone, 13 in the holding zone and 14 in the cooling zone. The operating schedule makes it possible to run the kiln over a three-day layoff of the loading crew. One operator then looks after the kiln and all auxiliary equipment.

The furnace is fired with 535 B.t.u. gas, supplied by the city gas plant, which is taken at the line pressure of 2½ to 3 oz. The gas is compressed to 10 lb. per sq. in., two Ingersoll-Rand compressors being installed, each with a capacity of 8500 cu. ft. per hr. These are driven by two 15-hp. motors so connected that either motor can drive either compressor.

Control of Gas and Temperature

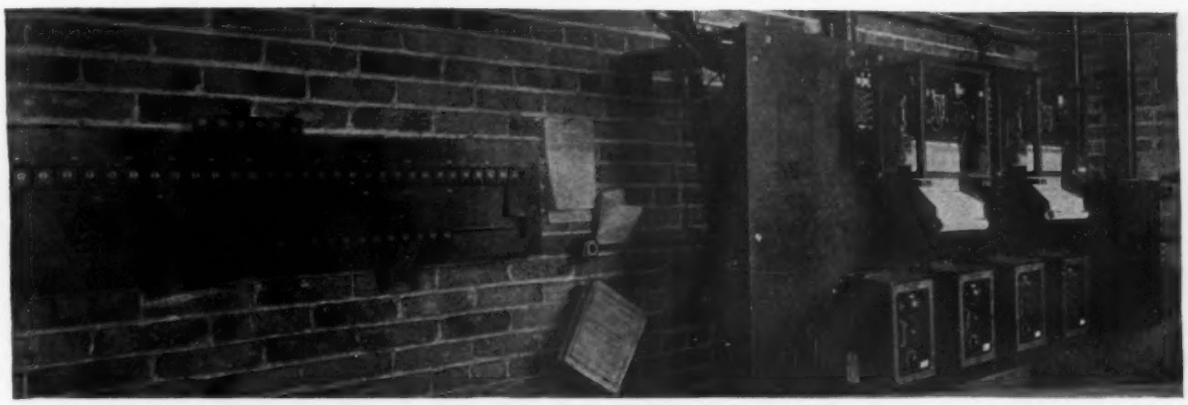
Air is inspirated by the pressure of the gas, making it unnecessary to supply air under pressure to aid in combustion. Another advantage claimed for the use of high-pressure gas is the ease of control, there being only gas, instead of both gas and air, to control. High-pressure gas also permits the use of smaller pipes for gas lines and it is stated that there is less variation in the pressure throughout the system than with gas used at low pressure.

From the compressor the gas passes into a receiving tank in which a 15-lb. pressure is made and an Emco regulating valve is provided which automatically holds the pressure at 10 lb. on the feed line to the burners. The gas feed line, 3 in. in diameter, runs along the center line at the top of the kiln. The distance from the compressor room to the first manifold is 300 ft.

Four manifolds are fitted, each feeding 18 burners, nine on each side of the furnace, making a total of 72 high-pressure burners. There is a 2-in. supply line for nine burners of each manifold, these extending down the side of the kiln. The burners used are No. 2 Hyperbo vertical burners, made by the National Machine Co., Chicago.

Gas control for each manifold with 18 burners is provided by a Dickson valve and two Globe manifold pressure regulating valves above the kiln. One Globe valve is set at a 7 to 8-lb. pressure, or to supply sufficient gas to maintain a temperature in the kiln in excess of the setting on the control instrument board, and the other is set at a 2 to 3-lb. pressure. When the Dickson valve is closed the gas, instead of passing through the high-pressure valve, is by-passed through the low-pressure valve. The Dickson valve is automatically operated from the instrument room and, by alternately passing the gas through high and

Loading and Unloading Track at the Side of the Kiln, Showing the Charging Cars and Method of Loading by Overhead Traveling Crane. One of the thermocouples in side wall of furnace appears at left, just above the empty car floor



Instrument Room, Showing Two Six-Point Recorders at Top of Board and Four Controllers for the Dickson Gas Valves at the Bottom. Miniature kiln board is at left

low-pressure Globe regulating valves, maintains in the furnace the temperature set on the dial of the control instrument in the instrument room. Each manifold has three gages. One is located above the kiln at the Dickson valve and one on each side at the manifold.

Thus the kiln has fully automatic temperature control. A pyrometer thermocouple, located at each Dickson valve, is wired back to a Leeds & Northrup control instrument in the instrument room, which automatically maintains the temperatures pre-determined. There are twelve thermocouples in the crown of the kiln, six in the heating zone and six in the cooling zone, connected to two Leeds & Northrup recording instruments located on the panel board in the instrument room. These instruments record the temperature at various points in the heating-up, soaking and cooling zones. There are also eight thermocouples in the side wall of the kiln, to register the heat at the level of the bottom annealing pot. In the instrument room is a miniature model of the kiln, showing the location of each car.

An advantage claimed for the semi-muffled type kiln over a fully muffled kiln is lower cost, both of installation and of maintenance, due to elimination of the muffle. It is not claimed that the fuel economy will be more than slightly better in the semi-muffled kiln than in the fully muffled type. Compared with the periodic or box-type annealing furnace, the semi-muffled type is claimed to be superior, because of a better control of temperature in the kiln, resulting in uniformity in product, reducing scale and increasing the life of the pots. It is estimated that, with this furnace, it will be possible to get 50 heats from a pot. The semi-muffled kiln, owing to the method of firing, has shown little variation in temperature between the top and bottom of the kiln.

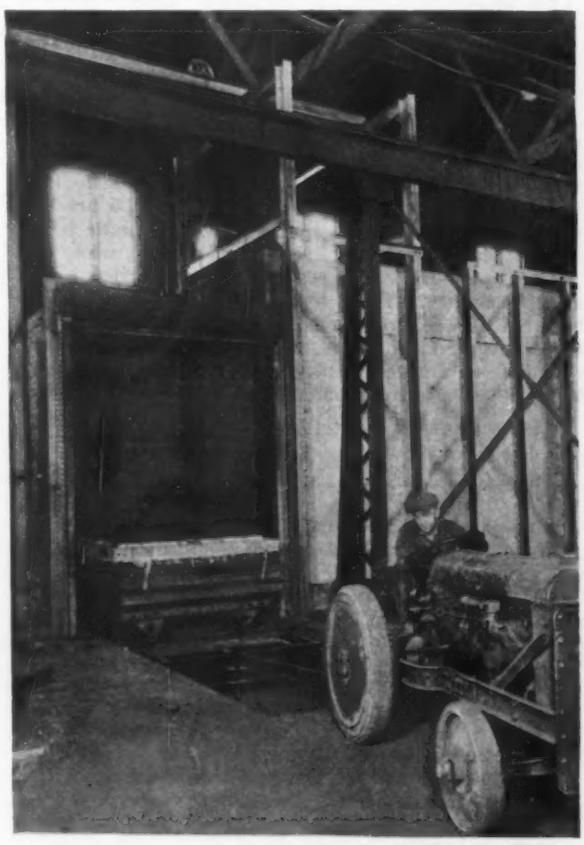
Manganiferous Iron Ores in Experimental Blast Furnace

The experimental blast furnace maintained by the United States Bureau of Mines, at its North Central experiment station at Minneapolis, has been developed to the point where it is now possible to undertake the solution of special problems. One of these is the efficient utilization of the manganiferous iron ores on the Cuyuna range and in other parts of the country. These ores are very important because of the limited supply of domestic manganese reserves. While it is the practice at a number of plants to add small amounts of manganiferous ores to blast furnace mixtures, there is some question as to the practicability of smelting a charge containing 100 per cent of these ores.

It is desirable to know whether it is commercially feasible to use these ores, and if so, what grade of metal can be made from them and what type of slags will give the highest recovery of manganese. More alumina occur in these ores than in straight Lake iron ores. This fact raises a question regarding the smelting of these ores. There has been considerable speculation as to the effect of the rather large amounts of combined water present in Cuyuna Range ores.

During a recent test, about 136 tons of metal was made by the Bureau of Mines in the course of 34 days' operation of the experimental blast furnace. This test was designed to cover the important phase of the problem outlined above. The results obtained will be studied to determine whether they are complte enough to permit of drawing conclusions as regards recommending a commercially feasible process for the utilization of these ores. If this is not possible, further experiments will be made.

For the extension of its boiler house necessitated by its new blast furnace, Weirton Steel Co., Weirton, W. Va., has bought eight 900-hp. boilers to take blast-furnace gas and three 725-hp. waste-heat boilers for the open-hearth plant from the Heine Boiler Co. This company will furnish also three 800-hp. gas-fired boilers for the Indiana Harbor plant of the Youngstown Sheet & Tube Co.



A Loaded Car at the Discharge End Being Hauled on the Transfer From the Vestibule to the Unloading Track

Sheet Metal Problems Discussed

Elimination of Light Gages for Roofing—"Master Brand" Sheets Limited in Uses—Low Quality in European Mills

STEADY progress in the elimination of the manufacture and distribution of galvanized sheets lighter than No. 28 gage was reported by the sheet metal jobbers and manufacturers attending the fifteenth annual meeting of the Metal Branch of the National Hardware Association of the United States, at the Hotel Gibson, Cincinnati, on May 13 and 14.

The three business sessions of the convention were characterized by an earnestness of purpose and a frankness of discussion which evoked much favorable comment from the members. One subject in the foreground of consideration was the disposal of second sheets. It was decided to send to each association member a questionnaire, so that the sentiment regarding this perplexing question might be crystallized and definite action might be taken.

That the sheet metal industry is adhering strictly to the simplification program outlined by the Department of Commerce at Washington was indicated by reports of the various simplification boards functioning as an integral part of the association. For example, results of an inquiry among the members of the association show that they favor the further elimination of certain grades of terne plate. Manufacturers already have discontinued the production of 12-lb. terne plate, and a letter is to be mailed to the members of the organization ascertaining their opinion about the elimination of 25-lb. and 30-lb. terne plate.

"Master Brand" Sheets Under Fire

PROMOTION of the "Master Brand" galvanized sheet was dwelt upon by several speakers. Its merits were outlined by the manufacturers advertising and producing it, while its disadvantages were set forth by distributers who object to carrying it.

In reporting as chairman of the Sheet Steel Board of Review on the elimination of light-gage galvanized sheets for roofing purposes, W. C. Carroll, Inland Steel Co., Chicago, cited the fact that in the six months from October, 1925, to March, 1926, inclusive, 52.5 per cent of the galvanized sheets manufactured by mills in the United States were No. 28 gage or heavier, while 45.5 per cent were No. 29 gage. Only 2 per cent were No. 30 gage or lighter. These figures were computed on the basis of mill reports giving a total of 60,000 tons for the period studied. Two-thirds of that tonnage was produced as formed roofing, the remaining one-third being flat sheets for roofing purposes.

Percentage of Light Sheets Made for Roofing

	No. 28 Gage and Heavier		No. 29 Gage		No. 30 Gage	
1925	Formed Roofing	Flat Sheets for Roofing	Formed Roofing	Flat Sheets for Roofing	Formed Roofing	Flat Sheets for Roofing
Oct.	39.6	57.7	54.0	41.2	6.4	1.1
Nov.	40.4	75.3	52.3	24.5	7.3	0.2
Dec.	61.7	82.6	36.7	17.1	1.6	0.3
1926						
Jan.	45.6	74.5	51.5	25.1	2.9	0.4
Feb.	46.9	62.7	51.5	32.5	1.6	4.8
March	45.1	41.2	54.9	57.7	...	1.1

The above report was based on mill production of 60,000 tons of galvanized sheets from October, 1925, to March, 1926, inclusive. Assuming that one-third of the production consisted of flat sheets for roofing purposes and two-thirds of formed roofing, the following facts were ascertained:

52.5 per cent of total production were No. 28 gage or heavier.

45.5 per cent of total production No. 29 gage.

2.0 per cent of total production lighter than No. 29 gage.

The jobbers, in relating the conditions existing in their own territories, testified that in the Atlantic Coast district, from Maine to Maryland, no sheet metal lighter than No. 29 gage was made or distributed in the past year; that in Ohio and Indiana Nos. 29 and 30 gage sheets have constituted less than 20 per cent of the total consumption; that the condition in the Northwest is favorable for the gradual elimination of grades lighter than No. 28 gage; and that No. 29 gage still is the prevailing standard in the South, although there has been marked progress in the discontinuance of the practice of marketing No. 30 gage sheets.

To the buyer who professes an interest in quality, but who perhaps makes his purchases strictly on a price basis, the "master brand" galvanized sheet is a challenge, said Mr. Carroll, in an address on "The Master Brand." The specifications which control its manufacture materially affect its cost of production and are so strict that no mill can live up to them without absorbing practically the entire extra of $5 a ton. Mr. Carroll emphasized that it is impossible to cover the entire range of purposes for which galvanized sheets can be used with one quality or one weight of coating for any particular gage. Thus the field of usefulness for the "master brand" sheet is limited, because the spelter coating is too heavy to withstand severe or rapid machine operations.

Mr. Carroll classified galvanized sheets into four grades. In the first class are those sheets which are to be utilized for flat work or are to be corrugated only. In the second class are the sheets which are to be corrugated and subsequently formed in curving rolls. In this class would be sheets for culverts. Sheets for general forming work, such as cornices and ventilating systems, fall within the third class. In the fourth class are sheets which must be drawn in dies or formed by high-speed machine operations, such as garbage can covers, machine-made conductor pipe, window frames and sashes. The "master brand" sheet, according to Mr. Carroll, will qualify for all of the purposes in the first two classes and for the less severe requirements in the third class. It must not be recommended or sold, however, for any of the purposes contemplated under the fourth class.

Roofing Business Not What It Used to Be

IN many localities jobbers and sheet metal contractors have lost their interest in galvanized sheets, partly because of the lack of sufficient profit and partly because of the absence of quality. Whereas the roofing tonnage 20 years ago amounted to from 15 to 20 per cent of the entire sheet production, today it is only 5 per cent of the total. The sheet mills, by means of the master brand and the national advertising which assists in its marketing, are trying to interest the public in sheet steel and to regain for themselves and the jobbers and metal contractors the business which has slipped away in recent years.

There is no reason, according to Mr. Carroll, why the same reasoning which applies to the master brand in galvanized sheets cannot be extended to other sheet mill product. He said that, at the fourth annual meeting of sheet steel executives at White Sulphur Springs, the recommendation will be made that licenses for the use of the master brand on other sheet products be granted to those who apply, when the analysis of the base metal can be approved and when there is assurance that the finished product will be fully up to the best commercial standards for the grades in question.

The general impression that the painting of gal-

vanized sheets is unnecessary is an important misconception, stated Joseph C. Eckel, American Sheet & Tin Plate Co., Pittsburgh, in a paper on "A Few Misconceptions Concerning Galvanized Sheets." He pointed out that the short life of the zinc coating, when subjected to atmospheric exposure, reveals clearly the necessity of painting to obtain the maximum service from the galvanized sheet installations. While the zinc coating materially increases the life of the sheet, it is not a permanent protection. Especially in an industrial atmosphere, the life of the coating is relatively short.

In reply to the query, "When should galvanized sheets be painted?" Mr. Eckel stated that the protective film which forms on the sheet under ordinary atmospheric conditions mars the bright appearance of the sheet and roughens the surface sufficiently to retain a tightly adherent coating of paint. The change in the appearance of the coating indicates the proper time for the application of paint.

MAKERS of sheets do not comprise the industry—they form only the production side of it.

Distributers, jobbers and dealers, and fabricators who utilize sheets in their products, form also an inherent part of the industry. They are the selling or distributing side of it.

Trade extension work for sheets is formulated for, and is as much in the interest of, distributers and fabricators as for sheet manufacturers.

By developing public appreciation of the service value and economy of products and forms of use for which sheets are preeminently valuable, trade extension work will make it easier for fabricators and distributers to sell in growing volume.

This quickening and broadening of public interest and demand, however, will manifest itself in larger volume of sale only to the extent to which fabricators and distributers render to the consumer the services of supply and all which that implies.

From "Accelerating Business," published by the Trade Extension Committee.

Machine-Coated Sheets More Uniform Than Hand-Dipped

ANOTHER noteworthy misconception, said Mr. Eckel, is the impression that the old hand-dipped galvanized sheets were superior to the modern galvanized sheets of the same weight of coating. He pointed out that the life of the sheet as a whole depends upon the part carrying the least coating; that, even under the most modern methods, it is impossible to obtain a uniform coating; and that those who have spent their lives in galvanizing work do not hesitate to say that the modern machine-coated sheets carry a much more nearly uniform coating than the old hand-dipped sheets.

Mr. Eckel directed attention to the widespread opinion that galvanized sheet manufacturers, to reduce costs, are responsible for making sheets with a lighter coating than was formerly used. He said that this is a misconception. The change to lighter coatings has been brought about by the direct solicitation of the consumer, who has demanded forming properties with relatively little regard for resistance to corrosion. In fact, the sheet manufacturers have been obliged to supply material for individual needs, and, where light coatings are required, the rate of production is retarded to such an extent that there is little if any monetary advantage.

Another misconception is the opinion that because of galvanizing the base metal is unimportant. The zinc does not provide a permanent protective coating and, should it become impaired, the necessity for selecting the most rust-resisting steel base is of the utmost value.

Getting Rid of Seconds

DISCUSSION of "Disposal of Seconds" provoked considerable comment and led to the suggestion by L. D. Mercer, United Alloy Steel Corporation, Canton, Ohio, that the mills, instead of segregating second sheets, should allot a certain percentage of them to distributers when the latter place an order for prime sheets. In this way the possibility of seriously disturbing the prime sheet market would be minimized, even though the plan would not remove seconds entirely from the channels of regular distribution and sale. It was agreed that this method would result in a wider distribution of seconds. The delegates finally voted to have the secretary canvass the members on this subject.

Lack of interest in terne plate has been one of the main reasons why its sales have fallen off so heavily in recent years, said John Follansbee, Follansbee Brothers Co., Pittsburgh, in discussing "How Can We Increase Sales of Terne Plate?" He stated frankly that terne plate is being produced at or below cost and that, unless there is promotion of new uses for this product in the near future, there will be no market for it within 10 years. Since no manufacturer is producing more than 100,000 boxes annually, it is obviously impossible for him to expend much money in promoting it. F. M. Fuller, American Sheet & Tin Plate Co., Pittsburgh, said that his company has been on the verge of discontinuing the manufacture of terne plate. Mr. Follansbee announced that within a short time his company probably will be making only two grades, an ordinary grade and a high-quality grade.

European Quality Poor

THAT American sheet manufacturers are producing material far superior to that in other countries was the contention of Charles R. Hook, vice-president and general manager American Rolling Mill Co., Middletown, Ohio, in an address on "Present Conditions in the Steel Industry." He told of his recent trip abroad and of the effort of French manufacturers to bring their plants up to the production standards of American mills. The quality of the foreign product, however, is poor. In one mill, according to Mr. Hook, 90 per cent of the material accepted as prime sheets would have been rejected in this country and stamped as seconds. He urged the members of the association to assist in bringing the sheet metal contractor to a realization of his responsibility to help in developing new markets and in regaining old business which has been lost in recent years.

Mr. Hook pointed to the metal house as the outstanding development of the year in the steel industry and quoted the recent prediction of THE IRON AGE that the construction of metal houses will increase the consumption of steel heavily if the industry is awake to its opportunity and makes the best of an unusually favorable situation.

Competition Is with Other Materials

THERE is an opportunity for the sheet metal contractor to become a specialist in sheet metal and all of the products made from it, provided that he familiarizes himself sufficiently with the sales advantages of sheet metal over other materials and builds up a quality business, said J. J. Rockwell, president Crosby-

Chicago, Inc., Chicago, in an address on "Recent Developments in Connection with the Work of the Sheet Steel Trade Extension Committee." The distributer has the same obligation to his customer that the sheet mill has to the distributer, and the jobbers' salesmen must become the teacher of the sheet metal contractor if the campaign of the Trade Extension Committee is to be successful. The danger to the sheet steel distributer does not lie in the competition of his fellow jobber, but in the competition of those selling other material for the same purpose.

A plan for compensating salesmen by giving them a share of the company's profits, without the added stimulus of a salary or a commission, was presented by M. L. Wolfe, Berger Brothers Co., Philadelphia. While the plan has been in operation only a short time, it already has resulted in cutting down traveling expenses of salesmen and in reducing the evil of shading prices to secure orders.

Major A. E. Foote, Division of Simplified Practice, Department of Commerce, Washington, related "The Practice of Simplification" as carried on by 55 different lines of business under the coordination of the Federal Government.

"There is undeniably a recession in business, and complaints of a decline in profits by wholesalers are numerous," according to W. H. Donlevy, Carter Donlevy & Co., Philadelphia, in his remarks as chairman at the opening session. "In the wholesale metal business we have in many sections two disturbing factors, destructive competition and a reckless dispensation of credit. How they can be corrected is a problem worthy of our consideration, for I believe that they account in a large measure for the unsatisfactory profits or red ink figures which frequently occur."

Committees and Reports

In the absence of Louis Kuehn, Milwaukee Corrugating Co., Milwaukee, chairman of the Eaves Trough and Conductor Pipe Board of Review, R. L. McHale, David Lupton's Sons & Co., Philadelphia, made a report for that board. L. D. Brueckel, Weirton Steel Co., Weirton, W. Va., chairman of the Terne Plate Board of Review, reviewed the work of his board.

The following members were elected unanimously to the Metal Committee for the 1926-1929 term: Harry L. Doten, Harry L. Doten & Sons, Boston; M. C. Summers, Thomas Sheet Steel Co., Niles, Ohio; F. M. Fuller, American Sheet & Tin Plate Co.; A. K. Raub, Raub Supply Co., Lancaster, Pa.; Robert H. Lyon, Lyon, Conklin & Co., Inc., Baltimore, and O. H. Demmler, Demmler Brothers Co., Pittsburgh. For the unexpired term 1924-1927 F. A. Moeschel, Newport Rolling Mill Co., Newport, Ky., was elected.

Members expressed a preference for Philadelphia as the city for the spring meeting in 1927. However, a vote by mail at a later date will decide this question. The October, 1926, meeting will be held at the Ambassador Hotel, Atlantic City. The local committee in charge of the convention arrangements consisted of E. H. Hoffeld, Ferdinand Dieckmann Co., chairman; A. P. Preyer, American Rolling Mill Co.; F. A. Moeschel, Newport Rolling Mill Co., and George McGlaughlin, American Sheet & Tin Plate Co.

SHEET METAL COLUMNS

Fluted Galvanized Product Made Only by a Canton Company

In a decision announced April 12 by the Interstate Commerce Commission, in which it held that rates on metal columns in official classification territory are not unreasonable, a concise and interesting sketch of the metal column industry is given. Dismissal was ordered of the complaint, made by the Union Metal Mfg. Co., Canton, Ohio, which the commission says is the only manufacturer in the United States of metal columns. The rates applying in official classification territory are first and fourth class in less-than-carloads and carloads respectively.

Describing the industry, the decision says:

"Metal columns are listed in the classification under the heading of building sheet metal work. They are made of No. 22 gage galvanized steel in cylindrical form, fluted in Doric or Corinthian style, with a slight curve outward at top and bottom for fitting into the capital and base. They have a double locked vertical joint and a smooth outside surface covered with a priming coat of red lead. They range in size from 3 to 40 ft. long and from 8 to 42 in. in diameter, the popular sizes being 7 to 8 ft. long and 8 to 12 in. in diameter. They are shipped in crates and almost exclusively in less-than-carload lots in closed equipment. Occasionally a carload shipment of the larger sizes is made in open equipment. The claims for loss and damage are negligible. As packed for shipment, their average weight per cubic foot is about 5 lb. and their average price per pound about 17c.

"Metal columns are used for ornamental purposes in the construction of hotels, banks, office buildings and residences, particularly in the porches of the latter, and in the South in the construction of Colonial homes. Complainant is the only manufacturer of them in the United States. Its shipments move all over the country, even as far west as the Pacific Coast. Sales are made direct to the consumer, although complainant has representatives throughout the country. Prices are quoted f.o.b. Canton, with freight prepaid.

"Hollow wooden columns are made in the same sizes as metal columns and are used for substantially the same purposes and are sold in competition therewith, at least to some extent. They are made of staves glued and nailed together. Their average weight per cubic foot is 8.5 lb. and average value per pound 8.8c. They are said to be inferior to metal columns on account of their tendency to deteriorate when used in the open. The fact that they take lower ratings is not shown to have operated in any way to complainant's injury or prejudiced the marketing of its commodity."

Striking Metal Installations in New York's Cathedral

Some unusual preparations are announced by the architects of the Cathedral of St. John the Divine, in New York, to provide pipes and fittings which shall last for centuries without a leak and yet be so installed as to permit necessary repairs. According to a statement by the Rev. Caleb R. Stetson, chairman of the committee on fabric of the cathedral, it is the ambition of the builders to have architects 2000 years hence as greatly impressed by the ruins of the cathedral as the students of today are by the imposing monuments of ancient Roman engineers.

In planning the system of heating, the probability being taken into consideration that within 50 years this will be done by electricity, the architects have attempted to devise an electrical distributing system having unusual durability and flexibility. The conduits are of fiber, 3 in. in diameter, with special joints terminating in special extra heavy cast brass outlet boxes set in the floors and designed to be covered by the flagging. The ducts are surrounded by concrete and, in case the fiber itself deteriorates, the channel that is left would admirably serve the same purpose.

For the pipes which will carry the water from the roof, material 6 in. in diameter and of extra heavy copper, 1/3 in. thick, with fittings of heavy cast brass are to be used. To avoid the clogging of such pipes by freezing, a melting device will be built at the gutter opening so that live steam can be turned on to melt the ice and snow. This pipe is to be coated with pitch, wrapped with 2 in. of insulation made of roofing felt and asphaltic roofing built solidly into the masonry.

For the steam piping wrought iron instead of copper and brass has been decided on because of the considerable expansion which the piping must stand. The steam pipes are of double extra strong pipe, ⅝ in. thick, with an interior diameter of 2½ or 3 in.

Selection of Steels for Tools

Purchase Specifications and Inspection Assure Uniform Material — Non-Shrinking Steels Discussed— Shop Tests Show Interesting Results

BY J. B. MUDGE*

THERE is perhaps no other question between the makers and users of tool steel, on which there is more discussion and less general agreement, than "What is the best steel for making tools?"

"Shall cutting tools be made from high-speed or carbon tool steel? If carbon steel, shall a small amount of chromium be added to increase the depth of hardness penetration? If high-speed steel, shall the cutting tools be made of the 18-4-1 type of high-speed steel; the 14-4-2 type; with or without cobalt, nickel, uranium, molybdenum, etc.?

"Shall blanking punches and dies be made of water hardening carbon tool steel, or of an alloy steel that hardens in oil to blanking die hardness, or of high-speed steel that hardens when quenched in molten salt at 1100 deg. Fahr. and subsequently drawn at 1100 deg. Fahr.?"

I question very much whether there is any "best" steel for all jobs. The nearest approach to an all-purpose steel is high-speed. There are so many factors involved in a test for the determination of "best" steel for any one job, that the results are open to question.

Tool Steel Specifications Desirable

Before describing the work which we have been doing along these lines for the selection of steel for tools, just a word about tool steel specifications. Immediately you mention specifications to a steel maker, you enter that ever growing argument: "Brand name versus specification."

It is admitted that a specification which merely specifies chemical analysis and tolerances, with stereotypes phrases which are in themselves more or less meaningless, is of little advantage to either the user or the supplier.

But a specification which maintains reasonable manufacturing variations of analysis and tolerances, which gives a workable range of physicals; a specification that tells the manufacturer what you want and also tells what, in your opinion based on your experience in your own shop, will best meet these requirements; this specification should be also a help to the manufacturer as it will enable him to visualize your needs and grade his material accordingly.

Whatever the merits or demerits of tool steel specifications may be, we have found them very desirable. The fact that several large users of tool steel have adopted specifications and are getting more satisfactory tools by an intelligent selection of the steel is probably the answer to the argument. With slight modifications, perhaps, the same results should be obtained by small companies as are enjoyed by the larger ones.

I have taken the time to speak of this subject because we believe that the first step in building satisfactory tools is the assurance of a method of selecting a type of steel of uniformly high grade.

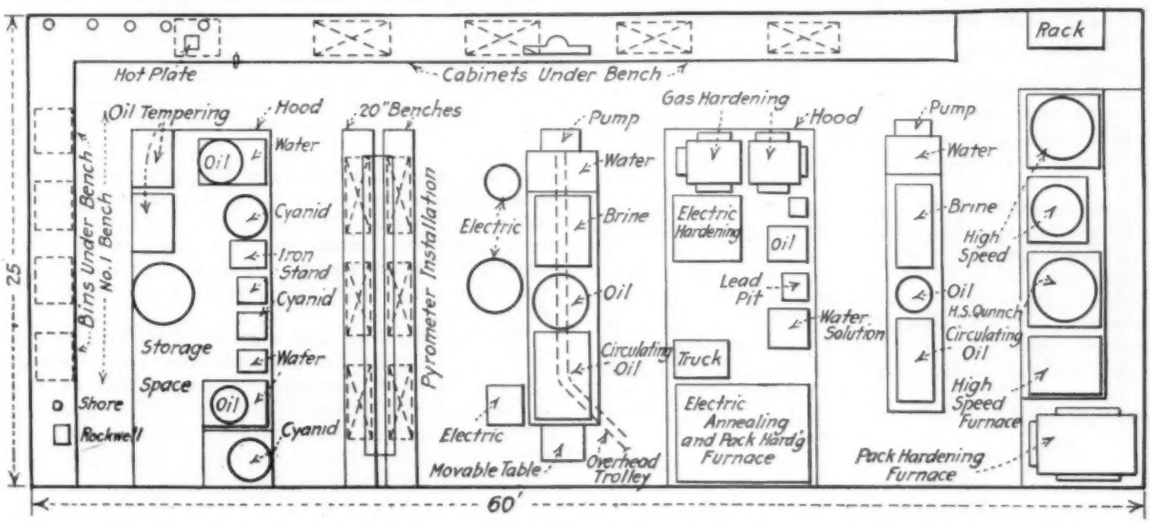


Fig. 1—New Hardening Room, With Central Control Panel, High-Speed Unit Installation and Other Features

Money Saved by Raw Material Inspection

There are several items to consider in selecting raw material, such as tool steels, and I shall discuss them in the order of their importance as we see them.

First, deal with a reputable concern which has a well-arranged mill, whose equipment, personnel and general business policy merit your confidence. In the manufacture of quality products, it is imperative that the material used should be closely controlled. I believe the use of a uniform base from a known source is good insurance when selecting tool steels. An inspection trip to the mill is of prime importance, and is very enlightening.

The second step is a means for identifying the types of tool steels. This involves purchase specifications, and a classification scheme for the various types of steels.

The next step is to set up in your plant a routine for raw material inspection, so as to be reasonably sure that you are getting what you pay for. This raises the question as to how much or how little inspection can be justified by the costs involved. It costs money to inspect steel; it also costs money to build tools from seamy or defective steel. You get a return from the money spent for inspection, but the money spent in

*Metallurgist Hawthorne Works, Western Electric Co. From a paper presented at the joint meeting of the Chicago section of the American Society of Mechanical Engineers and the Western Society of Engineers, held in Chicago, March 24.

building tools from defective steel is not infrequently a total loss, since they very often never get any farther than the heat treating department and when they do slip by and get into the shop, fail all too soon.

For a small plant which cannot afford a technical staff, microscopic equipment, etc., the minimum inspection should be visual; macroscopic, hot acid etch test and Brinell test.

Visual inspection requires considerable experience but should be used by all in the detection of seams, slivers, etc. To the best of my knowledge, this forms the major part of all mill inspections other than heat

Reproduction of Method of Classification for Making Drawings

TYPE OF TOOL	W. E. CO. TOOL STEEL NO.	HARDNESS ROCKWELL C SCALE
16. CUTTERS		
16.1 Form milling heavy duty	1	60-65
16.2 Form milling ordinary	13 to 17 depends on size	60-65
16.3 Side milling heavy duty	1	60-65
16.4 Side milling ordinary	13 to 17 depends on size	60-65
16.5 Spiral milling heavy duty	1	60-65
16.6 Spiral milling ordinary	13 to 17 depends on size	60-65
16.7 Shell milling	1	60-65
16.8 End mills	1	60-65
16.9 Fish tail	1	60-65
16.10 Rubber milling	13 to 17 depends on size	60-65
16.11 Profiling	1	60-65
17. DIES		
17.1 Button threading	15	58-62
17.2 Iron dust core	S.A.E. 3345	Brinell 477-555
17.3 Drawing		
17.31 General ordinary use	13 to 17	62-65
17.32 Sub. set box	23	62-67
17.33 Jack shell	1	60-65
17.4 Blanking		
17.41 For clock spring, silicon sheets and tools of intricate shapes	Listed under 7.51 1	58-62 depends on shape of part and thickness of stock
17.42 Ordinary blanking	13 to 17 depends on size	Same as above
17.5 Forming	13 to 17 depends on size	58-67
17.6 Shaving		
17.61 Heavy running and intricate shapes	1	58-62
17.62 Ordinary	13 to 17 depends on size	61-65
17.7 Embossing	13 to 17 depends on size	60-63
17.8 Swaging and bumping	23	62-63
17.9 Perforating		
17.91 Clock spring and silicon sheets	1	60-63
17.92 Ordinary	13 to 17 depends on size	58-62

analysis. In some cases this is supplemented by the fracture of an annealed bar, and in some cases of a hardened bar.

More information can be obtained I believe by the macroscopic hot acid etch test and at less cost than by any other I know; that is, for the detection of manufacturing defects. It is not difficult to make and can be carried out by men with even a slight experience in the handling of steels. This test shows decarburization, seams, scabs, flakes, slag, slivers and inhomogeneity in general.

The Brinell test shows uniformity and degree of anneal.

Tests Cheaply and Quickly Made

All three of these tests are cheaply and quickly made and show up marked variations and defective conditions which are a positive basis for rejection of undesirable material.

In the larger companies, these tests are supplemented by the microscope, which is probably the best means of evaluating the condition of the steel, i.e., the process heat treatment, etc.

It will be noted that no reference has been made to chemical composition in inspection. Other than touching the bar to a wheel and observing the spark, to see that machine steel or high-speed steel was not mixed with the carbon steel, the analysis inspection should be limited to a very small percentage of the whole. Perhaps an occasional check of the carbon content to see that the material is running consistent with the mill's practice, should be sufficient. In the case of alloy steels a check on the main alloying elements should suffice.

The cost of inspection is more or less determined by the amount of material inspected, and, if the chemical analysis is held to a minimum, should not run very high.

There are certain classes of material which would require 100 per cent inspection, i.e., a piece of steel that is to be used for an expensive blanking punch or die, expensive high-speed form cutters, milling cutters, etc. Others might require not more than 10 per cent inspection, i.e., drill rod, small bar stock in general, for making what are in reality machine parts and not tools. In general, it would be unwise to spend from $100 to $1,500 working up a piece of steel into a die, without taking reasonable precautions to ascertain that the steel is desirable for that work.

Hardening Room Methods and Equipment Important

Assuming that you are receiving a uniform high grade material, the next item of importance is the hardening room. Whereas no amount of scientific heat treatment will produce good tools from defective raw material, poor heat treatment will ruin the very best steel.

The human element comes first. Regardless of how much modern, scientific equipment a man has, he can still do poor work. Other than the human element, the most important feature in a hardening room is automatic temperature control. A furnace under automatic control, however, must still be used with care and judgment.

The arrangement and number of varying types of furnaces, the quenching solutions employed, their general arrangement throughout the hardening room are in each case determined by the work to be done. Production hardening is a quantity affair and process specifications for any one type of work can be closely drawn. Tool hardening being a quality or job lot proposition, there are no general rules. We have found it necessary to install all types of furnaces and quenchants and use practically all of the present-day methods in our hardening department. The arrangement of our new hardening room, which is now in process of installation, may be noted from Fig. 1.

Selecting Steels for Making Various Tools

Assuming now that we have a uniformly high-grade steel and a modern heat treating department, the type of steels to be used in making up the various tools may be discussed.

We distinguish in our plant between tools and machine parts as follows: If the assembled detail touches the piece part being produced it is classed as a tool, otherwise it is classed as a machine part. This is a convenient method for distinguishing these items for administrative purposes, but the physical properties necessary for the proper performance of tools and machine parts are not so easily distinguishable.

In designing a crankshaft or column or ram, where static loads or alternating and vibratory stresses are involved, it is a relatively easy matter to compute the stresses, apply a safety factor and specify a steel to withstand a load or have a fiber stress of 150,000 lb. per sq. in. and a 40 per cent reduction. An alloy steel with a suitable carbon range (0.45 to 0.55 per cent) when properly worked and heat treated will give it. Physicals such as I have mentioned are obtainable in forgings as large as 10 in. in diameter. The smaller pieces will give correspondingly better results. Testing equipment is available for measuring ultimate strength, yield

point, proportional limit, elongation and reduction, impact values, fatigue values, etc.

Tools, however, i.e., cutting tools, blanking tools, swaging tools, shearing tools, are used in a condition which prohibits tests of this type. Test bars made up and treated to simulate blanking punch and die conditions give results that are practically valueless, since steel in the hardened condition has no elongation or reduction to speak of, and the proportional limit and ultimate strength vary so as to be useless as standards of measurement. That leaves us with either the file as a means of detecting hardness or one of the hardness testing machines (i.e., Brinell, Rockwell or Scleroscope). Each of these instruments has its sphere of application, and we find use for all of them.

In testing hardened tools where the minimum distortion or marring of surface is desired, and rapid application of method is necessary, we prefer the Rockwell, and inspect our hardened tools 100 per cent. There

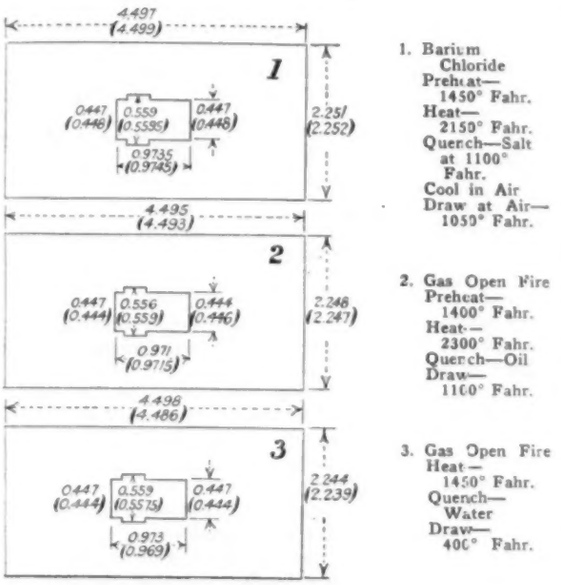


Fig. 2—Showing Distortion Features of a Carbon Water-Hardening Steel as Exhibited by an Intricate Shaped Blanking Die. Nos. 1 and 2 are high-speed steel. Measurements in brackets were taken after hardening

have been published, as you may know, conversion tables converting Rockwell to Brinell to Scleroscope, etc. Our experience has shown that these hold only for the type of material on which the results were worked out, and are liable to large errors when used on other types of material.

It should be remembered that all steels, carbon and alloy, in the dead soft annealed condition give physical results that are practically similar, depending on the carbon content. In general, they run from 60,000 to 100,000 lb. per sq. in. tensile strength. The distinguishing characteristic is the resistance to shock. It is only when heat treatment is resorted to that the inherent value of the alloying elements is brought out.

The effects of alloying elements, measurable in steels when drawn to a point where they can be tested in a tensile machine, are present also in steel hardened to blanking die hardness, but we look for these effects in a different manner. They are noted by means of the hardness values, fracture, and microstructure.

Theoretically, the manner in which alloying elements are effective is a debatable point, but in general, they seem to affect the transition point so that the critical quenching speed (the rate of speed with which the steel passes through the critical point) permits a mild quench (oil) to give the same or improved results with alloy steels that a drastic quench (brine) gives with the straight carbon steel.

This brings us to the so-called non-shrinking steels. Practically all of the types of so-called non-shrinking

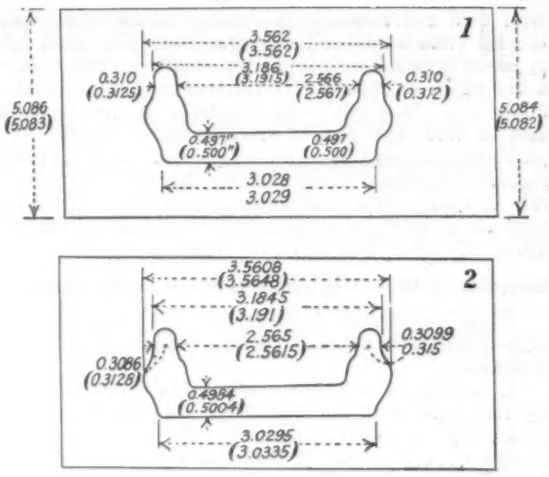


Fig. 3.—Varying Distortion Features of an Alloy Oil-Hardening Steel as Exhibited by an Intricate Shaped Blanking Die. The upper die is of high-speed and the lower of carbon steel. The dimensions in brackets were taken after hardening

steel now on the market harden in oil. Reasoning by analogy, you would say that a steel that will harden by cooling in air or even better, in molten salt or lead at 1050 deg. Fahr., would show even less distortion. We have such a steel and it does show less distortion; i.e., high-speed steel. Figs. 2, 3 and 4 show the varying distortion features of the three types of steel as exhibited by intricate shaped blanking dies. The carbon steel was water hardened, the alloy steel oil hardened and the high-speed steel hardened in molten salt (1050 deg. Fahr).

There is no such thing as non-distorting steels. The alternate heating and cooling of steels distorts them by reason of changes, occurring within the metal itself, the ultimate results being the summation of several factors. These factors include size, design, change of section, rate of heating, length of time at temperature, previous conditioning of the metal, and more important than any other, how the die is plunged into the quenching bath.

The simple experiment of heating a 0.092-in. carbon

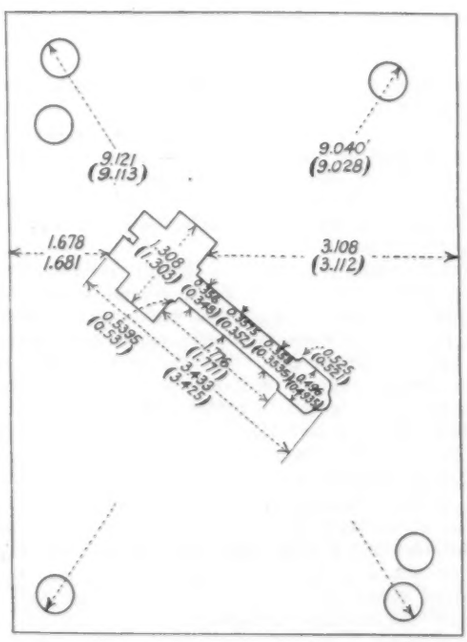


Fig. 4—Varying Distortion Features of an Oil-Hardening High-Speed Steel Die as Exhibited by an Intricate Shaped Blanking Die. Measurements in brackets were taken after hardening

steel drill rod through its critical range, when under tension from a rubber band, illustrates the small force required to cause permanent deformation. Fig. 5 shows a die which cracked due to intricacy of design, lack of fillets, etc. It is not to be wondered at that hardened dies of this type distort and sometimes crack. It is practically impossible to cool a piece of steel with varying cross sectional areas such as this has, at the same rate of speed. Our best solution is to keep the various sections as uniform as possible and to allow generous fillets whenever and wherever possible.

Selection of Steel Depends Upon Job to Be Performed

When and where to use carbon, special alloy, or high-speed steel depends entirely upon the job to be performed.

In cutting tools, if the speed of the operation raises the temperature of the tool above that which that particular type of steel can be drawn to and still retain its desired hardness, then a high-speed steel is essential, (excepting in machining hard rubber). Our milling

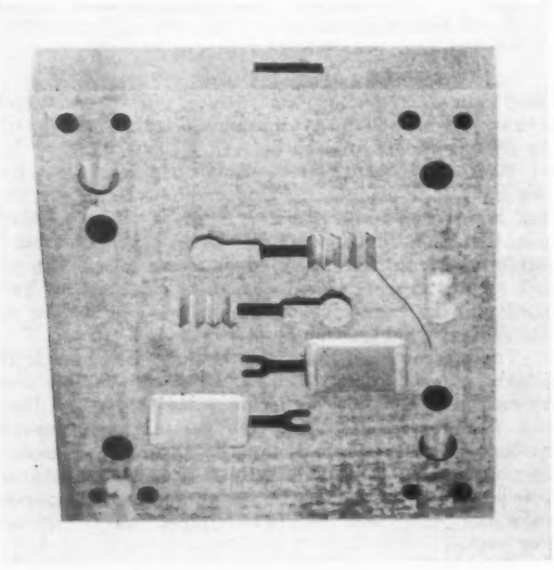


Fig. 5—A Cracked Die Due to Intricacy of Design, Lack of Fillets, etc.

section now uses practically 90 per cent high-speed steel cutting tools.

There are jobs, however, where, in addition to cutting qualities, a high shock or impact value is necessary. Jobs of this kind must be operated at slower speeds, and here carbon tool steel is preferable, because of its soft, tough core. Such tools are twist drills, reamers, taps, etc.

For blanking punches and dies on jobs such as nickel silver, carbon tool steel sheet, silicon steel sheet, in general, we favor high-speed steel over carbon tool steel (no red hardness involved), as we have found that this gives a longer life. For the general run of soft steels, brass, copper, etc., the economy effected by changing from carbon to high-speed is still a debatable subject. We are investigating several alloy steels and our No. 28 gives promise of being even better than high-speed steel from the standpoint of non-distortion, ease of heat treatment, long life, cost, etc.

The sheet reproduced elsewhere shows our method of classification for marking drawings. These sheets further simplify the marking of drawings and the choice of steels by the men in the shop as well as by the tool and machine designers.

In closing, I should like to point out some of our findings on shop efficiency tests, so-called.

As a result of observing 13 different blanking tools, operating through 113 set-ups, over a period of 18 months, our tool-standardization department has found that, in 46 per cent of the cases, the set-ups were taken down for some other reason than that the tool became dull. In the 54 per cent of the cases where the tool did get dull, as shown by throwing a burr on the piece part that caused its rejection in the inspection department, by the careful selecting of any two or three-week period of production, any of the 13 tools could have been shown to be better than any of the others.

Obviously, the trying-out of a single tool on a job of this type or any other type, as far as that goes, is a waste of time and money, so far as the conclusions regarding tool steel quality is concerned.

This test included 20 different "makes" of high-speed steel, including both the 18-4-1 type and 14-4-2 type, hardened in both the open fire and salt bath method. We use the milling cutter test in preference to the standard lathe tool method, because milling cutters constitute the major item of high-speed steel in our plant. The milling cutter test lends itself more readily to an accurate and reliable check of tool performance.

The tools were treated under accurate temperature control using platinum-platinum-rhodium thermocouples, and temperatures recommended by the various suppliers.

A specially heat-treated test bar (Cr-Ni; Brinell 260-300) about 3½ in. square and 30 in. long was used for the material to be cut and precautions taken to insure the same amount of side cutting friction in each case, as well as the depth of feed.

One of the main objections to cutting tests is the question which surrounds the point at which the cutter becomes dull. To remove any personal opinions on this point, a recording wattmeter was connected in the circuit with the motor of the machine and, as the cutter dulled, the increased load on the motor was recorded automatically, and by previously establishing a so-called break-down line, each cutter's performance was measured with reference to this point.

In all cases 18-4-1 was superior to 14-4-2 and in all cases the salt bath was approximately one-third as efficient as the open fire. So, where high-speed in salt is suitable for blanking dies, it is not desirable from the standpoint of cutting tools.

[By means of a series of photo-micrographic slides which showed the size and distribution of the carbide nests, indicative of bar stock in general, the author demonstrated that the tendency is for these nests to increase in size and amount, and that it is practically impossible in the hardening of tools to remove these nests by heat treatment alone.]

In order to insure a uniform distribution of carbides in this material, it is necessary to upset bar stock into the form of forged blanks, and this seems to be a gradually increasing procedure among the tool makers.

In an experiment on cold heading brass screws we selected and inspected a bar of stock, making six dies from the same bar. After machining, these dies were carefully heat treated, same furnace, same time, everything identical, inspected for tolerance limits after grinding, and placed in the shop for test. The variation in performance was in the neighborhood of 700 or 800 per cent.

Further investigation of this job showed that the personal element in setting up the job was so great as to make the results obtained (re-number of parts produced) practically valueless.

And that brings us to the final conclusion that, given good steel, good heat treatment, and good design, a careless operator can ruin the best tool ever made, and after the tool is cracked it is not always an easy job to place the blame.

The Maryland Slag Co., an interest closely identified with the Standard Slag Co., Youngstown, has awarded contracts for a slag reducing plant at Sparrows Point, Md., in connection with the blast furnaces of the Bethlehem Steel Corporation. This plant will be the largest operated by the parent company, which has a total of 18 scattered throughout the Middle West. Owing to enlarged business, the company is expanding its quarters and space in the Wick Building, Youngstown, where its principal offices are located.

Market Stability Needed in Sheets

President Horner Points Out That Large Volume of Business Has Been Done with Minimum of Profit and Suggests Ways of Putting Industry on Better Basis

POINTING out that all records for the production and consumption of steel sheets were broken in 1925 and again broken in the first quarter of this year, President W. S. Horner in his annual address to the National Association of Sheet and Tin Plate Manufacturers at White Sulphur Springs this week declared that this large volume was done without an adequate profit and that means should be taken within the industry to put it on a better and more profitable basis. Market stability, Mr. Horner said, is the great need of the industry. His address in part follows:

What is the solution of our problem? It cannot be an agreement to maintain a certain price level, or to limit production, or to allot territory. Any such agreement, even if it could be legally entered into, would hardly be effective. To some, a private understanding, or gentlemen's agreement, might seem to offer the way out, but aside from being in conflict with existing statutes, I am convinced that such agreements or understandings could not long be effective, because they would be basically and economically unsound. Any attempt artificially to influence or control the market price of any commodity is not based on natural laws, and all nature teaches us that man cannot ignore or violate her laws without penalty. In addition, any such action would savor of an attempt to follow the line of least resistance; an evading of the issue, an acknowledgment of defeat, and would certainly not reflect credit upon the industry or the men engaged in it. This surely is not the way.

Statistics Helpful to Stability

If, however, manufacturers will cooperate to obtain the facts relating to the industry of which they are a part and will study and be guided by those facts, the situation of which we complain will speedily right itself. As is well known, it was for the purpose of compiling and distributing such facts that the sheet steel association was conceived and organized 10 years ago.

It is simply a question of determining the facts, and then being guided by them, just as you do in everyday, personal life. If you went hunting, you would hardly try to shoot game that you could not see. If you went fishing, you would not cast your line into a stream which you knew to be polluted, and in which fish could not exist. Is it not equally foolish to try to obtain business that does not exist, however you might load your rifle or bait your hook with low prices? With demand for your product known to be at say 80 per cent of possible capacity, is it not equally foolish for each of you to think that you can operate 100 per cent?

In presenting to you several statistical reports for 1925, I urge that you keep these thoughts in mind. Annual data cannot be made the basis for any very intelligent regulation of individual business during the succeeding year; but similar reports are furnished from month to month, and, in some cases, daily. These current reports form an accurate and continuing barometer of the sheet steel business; they give a record of the immediate past, on which judgment of the immediate future may be based. They are not, however, self-operative. Repeating what I have so many times stated, and which you all well know but so easily forget, they can be expected to result in stability, only if and to the extent that they are studied, understood, and applied.

The Sheet Steel Industry in 1925

The year 1925 was the largest in volume of business that the sheet steel industry has ever enjoyed. When we met here a year ago the industry had just completed a quarter which represented the largest tonnage, both in production and capacity, of any quarter of record up to that time.

Such was our penchant for breaking production records, however, that in the last quarter of the year all records were again shattered, independent sheet steel manufacturers producing in excess of 1,100,000 tons, or 92.8 per cent of capacity.

We need hardly look any further than this for the cause of any unsatisfactory market conditions which may have existed during the year. Considering that we are in a period of great prosperity, is it not a reflection upon the business courage and acumen of those engaged in the business that with this record demand for sheet steel the industry as a whole should not have made a more creditable showing, compared with that of other industrial units?

The one cheerful angle of the situation is that workmen were afforded an opportunity for continuous employment.

As before stated, 1925 production broke all records, having amounted to more than three and a half million tons for the independent group, or 92.8 per cent of capacity. Production in 1925 was one-third greater than in 1924. The record of production over the last four years has been:

	Per Cent of Total Industry Represented	Net Tons	Per Cent to Capacity
1925	72.2	3,522,000	92.8
1924	71.3	2,637,300	75.6
1923	70.9	2,746,300	81.5
1922	68.7	2,321,000	74.3

Judging by these figures, it would seem that we are making great progress in at least one respect—that of operating efficiency. For the last three years capacities have been computed in accordance with an agreed standard, so that we have a definite basis for comparison.

Industry Able to Produce Above Rated Capacity

The figures clearly demonstrate a remarkable ability to produce in excess of rated capacity, and if continued may make necessary some revision in our present method of arriving at capacities, at least as regards certain companies. Some companies, by reason of possession of the most modern and improved equipment, and large percentage of heavy gages rolled, are able to produce from 25 to 40 per cent more than the standard rated capacity.

With the record production, shipments in 1925, as a matter of course, also broke all previous records. Total shipments of the group reporting, or 96.9 per cent of the independent manufacturers, were 3,456,000 net tons, or 91.1 per cent of capacity; 1925 shipments, as in the case of production, were just one-third greater than in 1924.

	Per Cent of Total Industry Represented	Net Tons	Per Cent to Capacity
1925	72.2	3,456,000	91.1
1924	71.3	2,592,600	74.3
1923	70.9	2,819,000	83.7
1922	68.7	2,264,000	72.5

Activity During First Quarter of 1926

Manufacturing conditions which applied in 1925 have continued in force during the first quarter of this year. Mills have continued to produce and ship sheet steel at a rate only slightly less than that of the last quarter of last year, which set a record for all time.

Average operations for the first quarter were 87 per cent, or just the same as for the first quarter of last year, which up to that time constituted a record. Production to rated capacity was 99.7 per cent, compared

with 95 per cent last year. These figures speak for themselves:

Records of Independent Sheet Manufacturers

	1st Quarter 1926		1st Quarter 1925	
Capacity	982,000	100.0	969,000	100.0
Per cent operations	87.0		86.7	
Production	979,000	99.7	920,550	95.0
Sales	763,000	77.7	783,920	80.9
Shipments	974,000	99.2	864,350	89.2
	1st Quarter 1924		1st Quarter 1923	
Capacity	947,000	100.0	912,730	100.0
Per cent operations	86.4		88.8	
Production	882,600	93.2	826,600	90.6
Sales	720,700	76.1	906,600	99.4
Shipments	790,700	83.5	821,800	90.1

Excepting last year, with its unprecedented rate of production in the fourth quarter, our records indicate that the first quarter of any year is usually the high point of the year, so far as production is concerned. With this in mind, some slackening in activity at this time might reasonably be expected that should not necessarily disturb the market structure, if individual company operations were correspondingly adjusted.

Total production of all classes of finished steel in 1925 was just about 20 per cent greater than in 1924. While 1925 production of sheet steel by the independent group was almost 35 per cent greater than in 1924, other interests did not operate at so high a rate, so that, taking the industry as a whole sheet steel production in 1925 was about 23 per cent greater than in 1924.

In 1925 sheet steel represented 12.5 per cent of the total production of finished steel products, as against 12.3 per cent in 1924.

In 1925 only one class of finished steel production ranked higher than sheets in tonnage—bars and shapes. In money value of products there is little question that sheet steel headed the list, the invoice value of shipments last year amounting approximately to $350,000,000. It is well to keep these facts in mind, when considering and establishing operating and sales policies. You gentlemen are the stewards of a vast economic unit. A thoughtless or unwise action by one company may easily cause strife and discord in the entire industry, bring about retaliatory tactics on the part of others, and result in confusion and great loss to everybody concerned, including the large army of workmen employed in your combined plants, and possibly the entire steel industry.

Growth of the Industry in 1925

On Jan. 1 there were in the United States 716 sheet and jobbing mills operated by 35 different manufacturers. This represents a net increase of 14 mills during the year, and must surely be regarded as a conservative growth. The tendency to over-expand has been the bane of American industry for a long time and has largely been the cause of our failure to attain stability.

Statistics of Entire Sheet Industry

		Per Cent of Capacity		
		1925	1924	1923
Total number of mills	716	716	702	666
Per cent of operation.		78.5	69.9	79.3
Total production.....	4,542,000 n. t.	86.5	75.6	83.0
Total sales	4,515,000 n. t.	86.0	81.7	76.3
Total shipments	4,452,000 n. t.	84.8	74.3	84.3
Unfilled tonnage:				
Jan. 1, 1926.....	1,034,000 n. t.			
Jan. 1, 1925.....	971,000 n. t.			
Jan. 1, 1924.....	608,700 n. t.			
Jan. 1, 1923.....	987,265 n. t.			

Distribution of Sheet Steel in 1925

One of the most interesting tables furnished sheet steel manufacturers is that relating to classification of shipments. It affords an accurate barometer, from month to month, of the increase or decline in demand for sheet steel by the more important consuming groups.

The automotive industry of course composes the largest single unit in the consumption of sheet steel. In 1925 this group took 34.5 per cent of all sheet steel produced by the independent group, as against 35.3 per cent in 1924 and 37.7 per cent in 1923. Too much emphasis and sales pressure has been placed on this branch of trade. Sheet steel manufacturers will do well to increase pressure upon the development of other consuming units with the view to changing the relationship which the automotive group sustains in the sheet steel industry today. A better diversification of our markets is sure to make for a firmer foundation upon which to build stability.

Some progress in this direction has already been made. While the total shipments of sheet steel, for the group reporting, was 32 per cent greater in 1925 than in 1924, the increase registered by the automotive group was 29 per cent. As against this, the tonnage of sheets used in the manufacture of household equipment, increased 64 per cent; metal furniture, 52 per cent; farm implements and machinery, 63 per cent; barrels, kegs and drums, 50 per cent; building materials, 44 per cent; stoves, ranges, etc., 41 per cent.

It is significant that the item of roofing registered an increase of 29 per cent, or 3 points less than the average, while that of culverts and flumes actually showed a decline of about 6 per cent. You will also note that demand for sheet steel for electrical apparatus increased less than 10 per cent, or somewhat under the average for all groups.

All of these reports illustrate in part the data which the association is furnishing from month to month. I do not contend that these annual statistics can be used in the formulation of business policies, except in a general way, since the interval between the reports is too great; however, I do contend, and most emphatically, that the reports which are furnished monthly, weekly and daily, can and should be used as the barometer on which to base current operating and production schedules, as well as other items affecting your business. This is the way to stability. A sane, common sense view of and respect for business conditions, as disclosed by statistical knowledge, would eliminate the obsession with which industry seems to be afflicted; that to make money it must operate to peak capacity all the time, regardless of how or where business is obtained, or at what sacrifice to market stability it is wrested from competitors.

Market Stability Through Extension Effort

If sheet steel manufacturers cannot or will not bring themselves to realize the fundamental unsoundness of indiscriminate selling tactics, and continue to operate at a rate considerably in excess of average demand, there is another way in which we can help the situation—and that is, by so increasing demand, through constructive joint advertising and trade extension effort, that the seeming necessity or temptation to cut prices, will be removed.

This we are attempting to do through the Sheet Steel Trade Extension Committee, which is closely approaching the completion of the second year of its operation. That it has already done much to stimulate demand for sheet steel we believe to be a fact; that it will continue to be increasingly beneficial and will eventually fulfill our reasonable expectations, we have little reason to doubt.

Two years ago at this place sheet steel manufacturers definitely determined to engage in joint advertising effort. This decision was the result of years of study and consideration of the matter, so that we did not rush headlong into it without carefully weighing all the factors which could be foreseen and anticipated.

Even so, we were, in a way, pioneers. We had seen the excellent results obtained in other fields by joint trade extension work, but so far nothing of the kind had been undertaken on a large scale within the steel industry.

It was realized that we would have a hard road to travel; that it would be far more difficult to build up a public consciousness of sheet steel, and stimulate demand for our products than it had been to allow demand to disintegrate before the onslaught of competitive products—prepared roofing, aluminum, copper and brass, laminated wood, etc. We were told frankly that it would take time; that there was no magic formula by which increased orders would be made to pour in immediately; that the foundation and groundwork had

to be carefully and solidly built before the superstructure could be raised.

The first year was largely consumed in perfecting the machinery and organization through which we were to work.

The second year has seen a more complete unfolding of the scope of the plan. But with it we have gained a better appreciation of the immense amount of active, forceful effort that will be required before the goal is reached. Unforeseen difficulties, trying situations, have been encountered, and, we believe, overcome in part at least. Up to this time we have been obliged to proceed cautiously, making certain of every step, trying to avoid costly blunders. Now we have reached a point where we may move more rapidly and with greater confidence.

While we have only now reached the stage where we may reasonably look for the results of our missionary work, it cannot be said that beneficial effects have not already been observed. It is most difficult in so short a time to gage the tangible results of any effort of this kind; there is no yardstick by which it can be definitely and reliably measured.

However, in order that we might if possible gain some idea as to the effect which our work is already having, the secretary of the committee communicated with representative manufacturers and fabricators in a number of lines, inquiring as to their volume of sales in 1925 as compared with the year previous, and asking their opinion as to what effect, if any, the activities of the Sheet Steel Trade Extension Committee has had on their business.

Products Made of Sheets Gain in Sales

Several hundred replies were received, many of them in great detail. They came from fabricators in almost every line in which sheet steel is used, and form very interesting reading indeed. It is almost impossible to condense the information which they contain, or to form any definite compilation of it. However, with a view to obtaining some general idea, we have surveyed them as best we could, and without even presuming to say that they are representative of the various industries as a whole, recognizing that the information from which the percentages have been compiled is somewhat fragmentary, I submit the following composite figures, as taken from the letters:

Products	Per Cent of Increase in Value of Gross Sales, 1925 Over 1924
Automotive stampings	10
Clothes dryers	25
Miscellaneous stampings	32
Metal ceilings	5
Metal furniture	40
Steel buildings	50
Steel cabinets	70
Radiator humidifiers	53
Farm equipment	58
Toys	50

In support of the approximate reliability of these figures, our own records show that the total shipments of sheet steel by the independent group for all purposes increased practically 35 per cent as against 1924.

In answer to our question as to their opinion of the 1926 outlook, practically all the letters stated that they anticipated a substantial increase in business this year. Judging from the excellent first quarter demand for sheet steel, it would seem that their prediction, or rather anticipation, will be fulfilled.

Over 800 Products Can Be Made from Sheets

Recently the Sheet Steel Trade Extension Committee prepared and distributed a pamphlet listing more than 650 different articles in the manufacture of which sheet steel is or can be used. Since then the committee has been advised of approximately 150 additional uses, which are not listed in the pamphlet. This makes a total of more than 800 separate articles of common use, which are either present or potential outlets for sheet steel. Contrast this with the conditions of perhaps eight or ten years ago, when sheet steel was used for only a comparatively small number of purposes. While many of these new outlets are as yet quite small in themselves, they represent in the aggregate an almost unlimited field for expansion and development.

Suggestions by President Horner for Overcoming Market Instability and Lack of Profits

More intelligent use of statistics of the industry as a guide to business policies.

Approximate uniformity in plant operations.

Development of other consuming units with a view to changing the relationship which the automotive group sustains in the sheet steel industry today.

A better diversification of markets.

Abandoning unsound and indiscriminate selling tactics.

Stressing the service value of sheet steel to the consumer rather than the price.

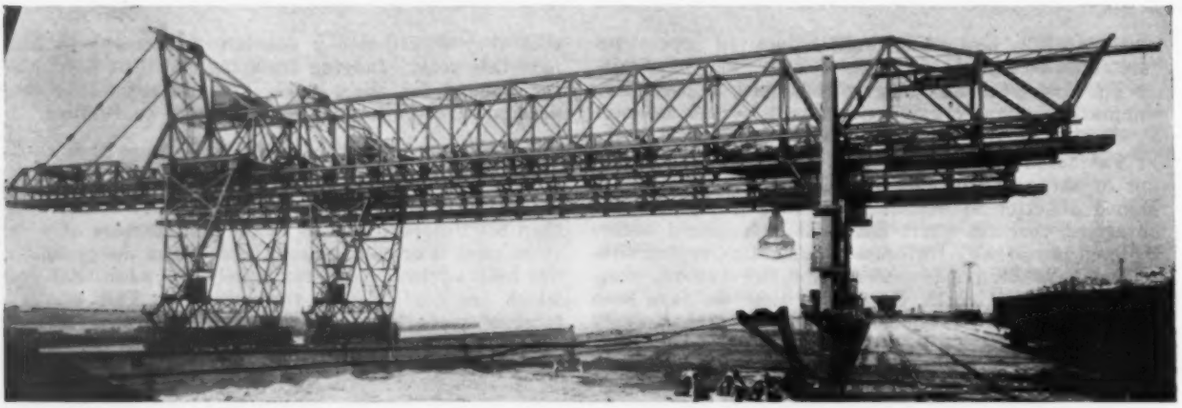
Creation and maintenance of confidence and friendship within its own group.

Steel by Direct Methods

Considerable work has been done on the production of steel by direct processes and numerous patents relating to this problem have been granted. The United States Bureau of Mines has made a thorough investigation of the production of sponge iron and the utilization of this material in the form of pig iron and steel. It is the purpose of an investigation being conducted at the North Central experiment station of the bureau at Minneapolis to make a survey of all the work that has been done and to determine what fundamental information is needed to develop direct methods for making steel. Gaps in the present fund of information will be filled in by laboratory experiments. The bureau is particularly interested in the use of non-coking fuel in reduction and the utilization of low-grade ores by concentration after metallization has taken place. Although the present supply of good grade iron ore and coking coal seems adequate for the immediate future at least, any development which would utilize a non-coking fuel in connection with the metallization of low-grade iron ores would open up vast quantities of dormant materials, basic to the manufacture of steel.

The school of mines and metallurgy of the University of Missouri, in cooperation with the United States Bureau of Mines and the State Mining Experiment Station, offers four fellowships. These are open to graduates who have the equivalent of a bachelor of science degree and have had the proper training in mining, metallurgy or chemistry, and who are qualified to undertake research work. The income of each fellowship is $800 per annum for the 12 months beginning July 1, 1926. For 1926-27 the four fellowships will be granted in the following subjects: Metallurgy of zinc, refractories for metallurgy of zinc and physical metallurgy (heat treatment of steel.) Applications will be received until June 15.

The Furnace Is Served by Two New Ore Bridges, Each With a Single Span of 265 Ft.



Stack Built for Low-Cost Output

Furnace Adds 40 Per Cent to Pig Iron Capacity of Inland Company—Plant Designed and Equipped for Economy in Operation and Maintenance

BY ROGERS A. FISKE*

THE recent completion of the No. 4 blast furnace of the Inland Steel Co., Indiana Harbor, Ind., will result in a 40 per cent increase in the pig iron output of that company. In addition, it is anticipated that production costs at the new furnace will be materially lower than in ordinary practice, inasmuch as the design provides many features which simplify operation and electrical devices are employed wherever possible to supplant manual labor. Further, considerable attention has been given to methods and equipment to be employed in making repairs with the least possible expenditure of time and labor.

Other blast furnaces at Indiana Harbor comprise No. 1, which has a daily capacity of 525 tons, and Nos. 2 and 3, each having a capacity of 575 tons, the total for the three stacks being 1675 tons per day. The new stack, No. 4, is rated at 700 tons per day, bringing the total capacity of the works up to 2375 tons per day.

The raw material for all furnaces is tied into a common high line. The ore dock serving the old furnaces was extended, parallel to the new stack. Two ore bridges, which were supplied for the new dock, have a single span instead of two short spans, as in the case of the bridges serving the other furnaces. Thus, the available storage space is increased to the extent of the valley which otherwise would be left between the two runways. The bridges, which were built by the McMyler-Interstate Co., Bedford, Ohio, each are rated at 15 tons per lift and have a span of 265 ft. One leg travels along the face of the dock and the other leg is near the high line, making it possible to unload either directly from the boat to the stock pile or to cars spotted on the high line. Bridges at the old dock operate on parallel runways having spans of 180 ft. and 85 ft. respectively. The high line is equipped with a transfer car constructed by the Arthur G. McKee Co., Cleveland, and the stock house bins are of the type made by the Freyn Engineering Co., Chicago.

Heavy Piling Required for Foundations

It is of interest to note that this blast furnace and all appurtenances are built on filled ground, the grade of which is 16 ft. above normal lake level. Indiana Harbor is at the south end of Lake Michigan, where the natural shore line consists of a deep bed of sand. It can readily be appreciated, therefore, that the construction of suitable foundations is a tedious and expensive task. The furnace foundation consists of 45-ft. white-oak piles, the tops of which are covered over with a reinforced concrete slab. Foundations for the furnace and ore yard required the driving of 12,000 50-ft. to 75-ft. piles. The skip pit, which is 30 ft. in diameter and 25 ft. deep, offered difficulties in back water and sand, the combination of which resulted in a condition not far removed from quicksand.

Break Bonds at Center of Each Key Brick in Lining

The furnace, which is provided with 12 tuyeres, is 94 ft. high, and has a 20-ft. diameter hearth, a 23-ft. 6-in. bosh and a 17-ft. 6-in. stock line. The mantle is built up of two plates 1¼ in. x 2 ft. 10 in., one angle, 8 in. x 6 in. x 1 in., and another angle 8 in. x 8 in. x 1⅛ in. The two top rings and one bottom ring of the shell are 1¼ in. thick and all intermediate rings are 1 in. thick. The vertical joints are butt-strapped inside and outside, and the horizontal seams are double-riveted. All seams are calked both inside and outside. A noteworthy feature of the hearth bottom-cooling plates is that they are 13 ft. high, in place of the usual 11 ft. This greater height will afford added protection against hearth break-outs.

In laying up the furnace lining it was decided to break bonds at the center of each key brick. In any horizontal section through the furnace the lining consists of three courses of brick. It is obvious that, if an effort is made to use one size of key brick for all three courses, radial joints will at times break directly opposite each other. To overcome this, three sizes of keys are used, the sizes being so proportioned that radial joints on adjacent courses are broken at the center of the bricks.

Bleeder Pipes Used as Columns

In the design at the top of the furnace usual practice was departed from to obtain a clear operating deck. This design required that the usual column construction supporting the hoppers and bell levers be done away with, and that the bleeder pipes be used as columns. These pipes, or columns, are made of ⅝-in. plate, except where structural members tie in, and at those points the metal is ¾-in. thick.

The main skip was built by the Otis Elevator Co., New York, this company also having furnished the large and small bell hoists. The skip house, which is located alongside of the furnace foundation, provides shelter for the skip, the large and small bell hoists, the coke breeze hoist, the stock-line indicator, which

*Western editor THE IRON AGE, Chicago.

was made by the Arthur G. McKee Co., and the forced draft fan for the stove burners. This fan is driven by a 50-hp. motor and was furnished by the Sturtevant Co., Boston. It is of the turbovane type and is rated at 25,000 cu. ft. per min. against a static water pressure of 7 in.

The skip is supported near its lower end by a pin, or hinged, connection. The framework is a clear span from tnat point to a pin connection supported from the furnace shell. This upper connection is hinged to provide for expansion and contraction of the furnace shell and the skip-hoist framework. This connection also provides for settlement of the furnace, should it occur. The skip cars are of the trailer type and each has a capacity of 210 cu. ft. The top distributer was furnished by the Arthur G. McKee Co.

Electric Controls Eliminate Labor

The object sought in laying out and planning the raw material handling equipment was to reduce the number of man-hours required to operate the furnace and to obtain the lowest possible operating cost. To accomplish this, an extensive system of remote-controlled electrical equipment was installed.

The furnace design provides for four skips per charge—that is, two of ore and stone and two of coke. One man operates the scale car, which was made by the Atlas Car & Mfg. Co., Cleveland. The car is divided into two compartments, each holding one-half of a charge. The scale car makes only one trip to the bins for an entire charge of ore. The operator unloads the ore into the skip and then, without moving the car, he completes the furnace charge by loading the two skips with coke from bins located overhead.

The same attendant then operates the remote controls for the skips, which, upon reaching the top, automatically throw switches which operate the small and large bell hoists. All remote controls are brought to a central board located at the skip pit. With this arrangement it is anticipated that three stock house men will be eliminated on each turn.

Coke from the overhead bins passes over a stationary cascade screen before falling into the skip bucket. In this way the breeze is separated and is passed by chute to a small C. O. Bart'ett & Snow Co. skip, which discharges to an overhead tank from which the breeze is unloaded for distribution to chain-grate stoker-fired boilers. The skip is automatic and is operated by an electric switch, which is thrown by the weight of the bucket when it becomes loaded with a predetermined amount of breeze.

The Arrangement of the Bleeders Provides a Clear Deck and Permits Free Movement of the Bell and Hopper by Trolley

As auxiliary equipment to the coke handling system, a belt conveyor, now under construction, will convey coke from the present batteries of ovens, and also from two new batteries, which are nearing completion, to a storage bin on the blast furnace high line. From this storage bin a coke scale larry will fill the individual furnace coke bins. This arrangement will result in economies of transportation and will eliminate yard congestion.

The Outrigger Is a Permanent Fixture and Can Elevate Parts and Place Them in Position Without Changing the Hitch

Easy Handling of Bells Provided For

In connection with the bleeder construction there has been provided an outrigger carrying a 15-ton trolley. This can be used to pick up a large bell from the ground, elevate it to the top of the furnace, rack it back and drop it into position without changing the hitch. Incidentally, the bell lever supports are movable, and hence provide an easy and economical method of centralizing the bells.

Four stoves have been constructed, each 25 ft. in diameter and 105 ft. high. They are of the two-pass, side-combustion type, and each is equipped with a Steinbart gas burner. The bricks are 3 in. in thickness, and the checker openings are 5¼ in. square. The stoves are equipped with water-cooled gate valves, furnished by the Freyn Engineering Co. The chimney valves are of the Weinel patent type, also supplied by the Freyn Engineering Co. The stoves are blown off through an underground flue which connects with the draft stack.

Unusual precautions were taken by the engineers to overcome the stresses of expansion and contraction in the hot blast main. After calculating the expected movement due to heating, the main was shortened by one-half of this expansion. During erection this short-

The Transfer Car Operates on the High Line and Moves Materials From Ore Bridge to Blast Furnace

age was taken up by springing the expansion joint. Thus when the main is heated or cooled, the movement of the joint past its center or normal position will be only one-half of the total expansion or contraction.

Permanent Maintenance Fixtures Are Installed

A monorail has been erected at each stove to facilitate the changing of the hot blast valves. The bleeders and downcomers are lined with 4½ in. of first quality fire brick. A Cochrane Corporation multiport relief valve is installed in the air duct leading from the pressure burner fan. A Feld gas washer, made by Bartlett-Hayward Co., Baltimore, is 18 ft. in diameter and consists of seven stages. This washer is electrically operated and is designed to function on about one-half the amount of water used in the tower type of washer. It will operate with a water pressure as low as 5 lb. gage.

The cast house is laid out to permit splitting the iron to both sides of a central runner, in this way eliminating much runner scrap. A track for miscellaneous material in the cast house is located beneath an overhead electric travelling crane. This building also houses bins for the storage of sand and coke breeze. Two 100-ton closed-top, hot-metal ladles, lined with specially designed fire brick, were furnished by the Treadwell Construction Co., Midland, Pa.

The addition of this furnace required the installation of new blowers and power generating equipment, all of which were coordinated with the general plan of electrifying the entire mill. Blast furnace gas not used at the stoves is piped to a new boiler house, where it is fired under two 1250-hp. and four 1500-hp. bent-tube type boilers built by the Heine Boiler Co., St. Louis. These boilers are also equipped with auxiliary oil-burning equipment, which is placed in the rear of the setting.

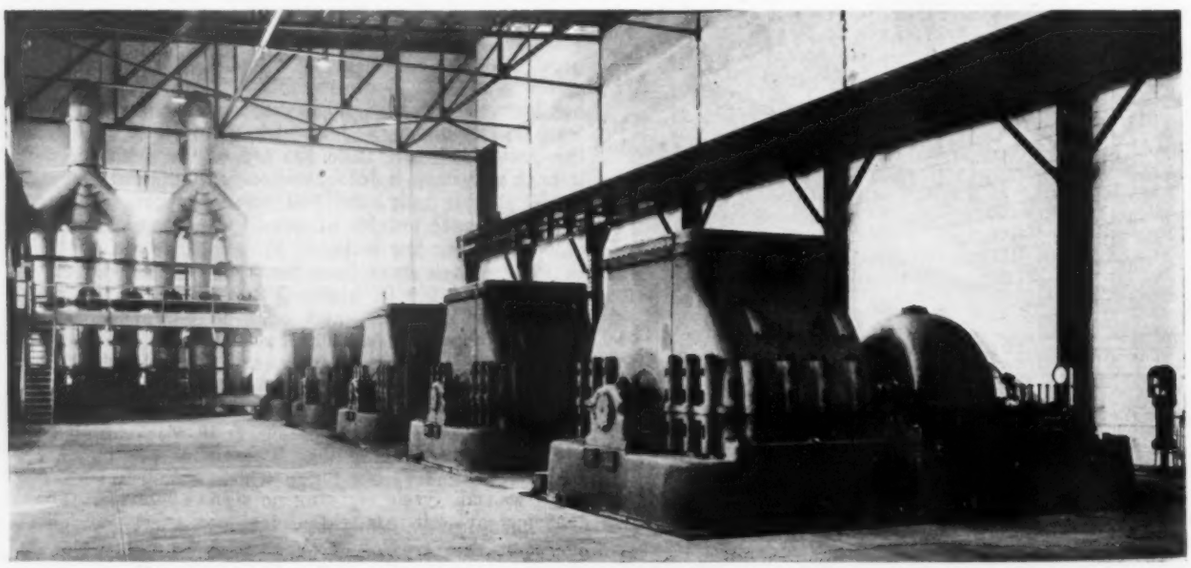
Two Turbo-Generators of 12,500 Kva. Each

Two Westinghouse Electric & Mfg. Co., East Pittsburgh, turbo-generators have been placed in a new alternating-current power station. These units are each rated at 12,500 kva., 3 phases, 25 cycles, 1500 r.p.m., and 2300 volts. Another similar unit will be installed at an early date. The new station will supplant an old direct-current plant, and substations will be erected at various load centers where direct-current is still required.

Five new Ingersoll-Rand Co. steam-driven turbo-blowers have been installed. Each blower is rated at 60,000 cu. ft. per min. against 30 lb. pressure. This arrangement provides one blower for each furnace and leaves one unit as a spare. The new blowers replace 10 compound reciprocating units. A new pump house provides space for six motor-driven centrifugal units, the total rating of which will be 210,000,000 gal. per 24 hr.

The motor equipment for the new blast furnace plant was built by the Westinghouse Electric & Mfg. Co., and the remote controls and switchgear used on the furnace skip hoist were furnished by the Otis Elevator Co.

The blast furnace unit was designed in its entirety by the operating and engineering departments of the Inland Steel Co. It was erected by the Riter-Conley Co., Pittsburgh.



Five New Turbo-Blowers Have Been Installed to Give Added Capacity and to Replace Old Reciprocating Units

Gear Makers Meet in Detroit

Elimination of Oil Infections Dealt with in One of Several Addresses at Annual Meeting— Standardization Work Progresses

GOOD attendance marked the tenth annual meeting of the American Gear Manufacturers Association, held at the Book-Cadillac Hotel, Detroit, May 13, 14 and 15. Addresses made at the five general sessions were on a variety of subjects and progress reports submitted by the association's technical standardization and other committees were actively discussed. An afternoon was devoted to plant visitation, sight-seeing and golf. Abstracts of the addresses and notes relating to the progress of some of the association's standardization activities are given below.

Better Steel Urged by President in Opening Address

BETTER steels, a code of ethics, industrial relations, business expansions and taxation-depreciation were among the subjects taken up by President Frost in his address of welcome, which was under the title of "The Common Good."

Attention was called to the discussion of the paper on "Improvements Needed in Automotive Steels," presented by W. G. Hildorf, Reo Motor Car Co., Detroit, at the last meeting. In that discussion it was suggested that the mills should be asked for material freer from impurities and segregations and material that should be uniform in response to proper heat treatment. "I still believe this to be a subject of primary importance," said President Frost, "and hope that you will use every effort to bring it to pass."

Relating to a code of ethics, he said: "So far, we have not adopted any code of ethics to which we could and should all subscribe, and although I realize that for most of us no such guiding document is necessary, we can all appreciate that its influence for straighter thinking would be worth while."

Reference was made to preaching the gospel of the gear specialists. It stands to reason, he said, that an organization trained and continually working on one line of endeavor becomes more proficient than where the duties of the supervising force compel it to function by contracting with many dissimilar departments. It is incumbent, therefore, upon all of us to preach the gospel of specialization and to uphold our argument by seeing to it that right prices are maintained through efficiency and that quality is commensurate with the price paid.

On the subject of industrial relations, President Frost said in part: "The men of the shops do not want patronizing in the way of welfare work, club rooms, picture shows, and the like, unless they have a definite voice in their establishment, control and support. What they crave is a just recognition of the part they play in the great economic game and a fair share in its returns. My observations lead me to believe that you men of the gear industry are above the average in your attitude toward labor and this in turn points to one good reason why most of us can say, in all honesty of belief, that we have the finest lot of workmen of any shop in our respective communities. Square dealing and fair, if not actually liberal treatment of our employees, ought to make unionism and its attendant cost to the worker unnecessary and a thing of the past."

Business expansions, it was said, should be studied so as to buy when prices are the lowest; and more than all else have equipment all set, ready to go when the wave of improved conditions comes.

Several instances occurring during the past year were said to indicate that not enough depreciation is allowed to be taken off on at least some types of equipment. "Obsolescence has come to play so important a part in determining the value of a machine that I feel we should wipe off at least 25 per cent rather than 10 per cent for the first year. It might even be well for the incoming president to ask the public policy committee or our representative in the Chamber of Commerce of the United States to bring the matter up for discussion in a national way, looking toward a change in the present law."

Solves Problems of Oil Infections

HOW skin infections among workers in cutting oil at the plant of the Warner Gear Co., Muncie, Ind., were eliminated was interestingly outlined in an address on "Lifting the Veil of Oil Infections," by W. D. Price, service director of the Warner company. Mr. Price's remarks were confined to the solving of the problem that confronted his company and his suggestions were not offered as a panacea for all oil infections.

During the first ten months of 1925, the company experienced an epidemic of 60 infections, which cost it 900 days lost time and its compensation carrier many hundreds of dollars, one case alone amounting to nearly $1,000. The insurance company was demanding relief and an increase of 25 per cent in premium rates was threatened.

Investigation was begun and the first effort to solve the problem was in conjunction with the company supplying the oil. That company proved conclusively that its method of distillation with its accompanying heat would kill all life, and that its practice of steaming all containers used in shipping would also eliminate germs.

Further study suggested that perhaps the oil was being contaminated while being used in the gear cutting machines. Following this suggestion, samples of new and used oil were sent to a chemical laboratory and it was found that the new oil was pure, but that the used oil contained bacteria.

With the assistance of a local hospital, a series of pathological tests was made at all stages of processing, beginning with new oil, then reclaimed oil, and oil in machines. Cultures were also taken from wiping rags, both used and newly purchased, and from boils and pimples.

These tests were said to show that both the new and reclaimed oils are pure. Oil in all machines tested showed large quantities of pus-forming bacteria and other disease germs. Rags purchased as sterile were found to abound in germ life. Pus from infections was found to contain the same family of bacteria discovered in the used oil.

After much search a germ destroyer (a coal tar acid disinfectant) that was active in oil was found. This disinfectant was applied to the used oil in several machines, and after periods of one, five and ten hours, the oil was analyzed, showing no signs of germs. This germ destroyer, it was stated, does not affect the functioning of the oil but acts as a purifier. A method of measuring the deterioration of the disinfectant was discovered and a formula for maintaining the correct amount at varying temperatures was devised. The

working formula is 1 per cent to each machine at initial application and 1 per cent to new oil at each subsequent renewal. In the case of hobbing machines, where the working temperature is higher and burns out the disinfecting agent more quickly, 1 per cent is added between oil renewals.

In addition to the elimination of oil infections, hair follicle oil rash has been done away with. This rash, it was said, was taken as part of the work by men who for years worked in oil, and was the cause of continual irritation, if not suffering.

The wiping rag, which had been formerly regarded as common property, has been elevated to the handkerchief class, eliminating another source of germs.

Officers and Executive Committee Reelected

E. J. Frost, president of the Frost Gear & Forge Co., Jackson, Mich., was reelected president of the association. A. F. Cooke, vice-president of the Fawcus Machine Co., Pittsburgh, and B. F. Waterman, engineer, Brown & Sharpe Mfg. Co., Providence, were reelected as first and second vice-president, respectively. C. F. Goedke, secretary of the William Ganschow Co., Chicago, continues as treasurer, and T. W. Owen, 2443 Prospect Avenue, Cleveland, as secretary.

E. J. FROST

Balloting for members of the executive committee resulted in the reelection of George L. Markland, Jr., chairman of the board, Philadelphia Gear Works, Philadelphia; A. W. Copland, president of the Detroit Gear & Machine Co., Detroit; R. P. Johnson, president of the Warner Gear Co., Muncie, Ind.; and B. F. Waterman, engineer Brown & Sharpe Mfg. Co., Providence.

The Pratt & Whitney Co., Hartford, with H. D. Tanner as executive representative; the Warner Corporation, Muncie, Ind., with B. E. Johnson as executive representative, and the Accurate Gear Corporation, Brooklyn, N. Y., with J. J. Braun, Jr., as executive representative were elected to membership in the association. The first woman member of the association is Miss Myra Hamilton, who was elected as associate representative of the Hamilton Gear & Machine Co., Toronto, Canada. George M. Eaton, chief mechanical engineer, is an additional associate representative of the Westinghouse Electric & Mfg. Co.

The place and date of the fall meeting will be decided upon at a forthcoming meeting of the executive committee.

The banquet was held Friday evening, May 14, in the ballroom of the Book-Cadillac Hotel. The toastmaster was A. W. Copland, president of the Detroit Gear & Machine Co., and the chief speaker was W. B. Stout, manager of the aviation department of the Ford Motor Co. Mr. Stout discussed interestingly the future of the airplane in commercial transportation and dealt with some misconceptions of air transportation, the safety of commercial flying being stressed. Another feature of the banquet was the showing of motion pictures of a trip around the world, made by T. P. Horsburgh, sales manager Horsburgh & Scott Co., Cleveland.

A golf tournament was held the afternoon of May 14 at the Hawthorne Valley Country Club. R. S. Drummond, vice-president of the Gear Grinding Machine Co., Detroit, was the winner of the silver cup donated by Mason Britton, vice-president of the McGraw-Hill Co., New York.

Several members visited the River Rouge plant of the Ford Motor Co., which extending for more than a mile in length and covering 1100 acres with its large buildings, stacks and towers, is unusually impressive. The handling of iron ore and limestone at the company's docks was seen, and also the coke ovens, blast furnaces and rolling mill. Sections of the machine shops and the Fordson tractor assembly lines were inspected, also.

Urges Replacement of Obsolete Equipment

REPLACEMENT of "obsolete, dollar-eating, time-wasting" machinery was urged by Mason Britton, manager of the *American Machinist*, in an address on "Are You Using Pre-War Stuff?"

Some of us may at times forget, said Mr. Britton, that 1914 is quite as remote industrially and mechanically as it is politically. Impressive figures were given to show the advance everywhere in national productivity, with the accompanying decrease in the number of human-hours or human-minutes per piece, per ton, per dozen, per acre produced. This large increase in productivity was attributed to the machine, which "is shouldering more and more the work of the nation and is everywhere becoming more and more efficient." In the last 12 years, it was stated, over 5940 new metal-working machines and tools have appeared on the market—improvements on old types, new developments—all designed to increase output and accuracy and to reduce upkeep and labor.

Some results of an investigation by the *American Machinist* of the practice of several widely known manufacturers in making their machine replacements and maintaining their shops at high efficiency were given. These manufacturers, it was said, agree on one fundamental: The primary step in keeping shop equipment up-to-date is to know exactly what each machine is producing and costing. Methods of making investigations and recommendations for new equipment in some of these shops were outlined and also the method of several companies in deciding when to replace equipment. Views on the question of how quickly must the new machine pay for itself were quoted, and a formula used by some production executives in reaching the decision was illustrated.

Other factors were discussed and it was pointed out that in all of the big modern shops investigated machine replacement is becoming a science, just as machine production is already a science. Machine selling was also stressed as becoming a science, the production men in most of the plants investigated commenting favorably on the quality of machine tool salesmanship. The influence of equipment on the operators, was also emphasized. Good machines, he said, stimulate men to do good work. Old machines that are always breaking down, and slow clumsy methods of handling materials from one process to another, make men themselves slow and careless.

Relation of Load to Wear on Gear Teeth

A FORM of yardstick for use, in the absence of more exact knowledge, in making useful comparisons on the wear on gears, was suggested in a paper on the "Relation of Load to Wear on Gear Teeth," by Earle Buckingham, associate professor of engineering stand-

ards and measurements, Massachusetts Institute of Technology, Cambridge, Mass.

The requirements that gears must meet have become more and more severe, and today we are faced with an additional problem, said Mr. Buckingham. We are seldom troubled with the breaking of gear teeth, but often find that the gears are wearing too rapidly. Although we have thousands of installations in service, the several factors involved are so different that we are unable to draw any useful conclusions until we can establish some method of reducing this data to a common basis of comparison.

Some of the recently published experiments on the wear of gear teeth were cited. All of these investigations dealt primarily with the rate of wear on the tooth profiles, and the tooth pressures were sufficiently high to obtain this wear after a comparatively few hours' run. Producers of gears, however, it was said, should not be interested so much in how fast a gear tooth wears, nor to what shape it wears, as interested in knowing the maximum loads that can be imposed upon the gear teeth without obtaining any appreciable wear. It was pointed out that in this respect gear tooth wear is very similar to the wear on plain bearings. The rate of wear on bearings is a secondary matter; the essential thing is to establish reliable pressure and velocity relationship such that wear to any appreciable extent does not take place. Once wear starts, the further useful life of a bearing is very short. The same was said to be true of gears. We should search, therefore, said Mr. Buckingham, for some method of determining the pressure and velocity relationships on gear teeth that will result in negligible wear for long periods.

Wear on gear teeth, it was stated, becomes apparent, in many cases, first at or near the pitch line. The radius of curvature of the gear tooth profile at the pitch point is selected as the one to use as a basis of comparison. The contact and pressure conditions that exist between two cylinders were discussed and it was pointed out that the point of interest is not the total pressure or stress, but rather the maximum stress at any point that results from a given pressure. This stress is known as the "maximum specific stress," and "to determine this stress between two cylinders in contact under pressure, we have the Hertz equation. By transposing this equation, we can put it in terms of pitch diameter, pressure angle and ratio of gears, and can get some idea of the compressive stresses set up in gear teeth."

The latter equation was used to compare the data from a large number of different gear drives by solving K (stress factor) and then determining the amount of the maximum specific stress. The results were far from uniform, which was to be expected because all gear drives are not loaded to their extreme capacity. One pertinent fact, however, seemed to stand out. When the stresses thus determined were below the elastic limit of the material, the wear on most of these gears was not appreciable; when the stresses exceeded the elastic limit, in some cases the gears stood up, but some of them showed signs of rapid wear. It would appear, therefore, that the elastic limit of the material was a good stopping point in determining safe loads for wear. It was also said that it might seem that the rate of wear should be proportional to the pressures, all other factors being equal, but that this does not prove true in practice. There is evidently a critical point below which the wear is negligible and above which the wear is rapid.

As a result of the comparisons made on different gear drives a set of constants for use in establishing the maximum safe load for wear on gears of different materials was worked up.

Stress Concentration at Tooth Root Studied

A paper on the "Strength of Gear Teeth," by S Timoshenko and R. V. Baud, research engineers of the Westinghouse Electric & Manufacturing Co., was received with interest. In this paper, which was illustrated by lantern slides, stresses and deflections in gear teeth are discussed.

By using the photo-elastic method the stress concentration at the tooth root has been studied and the factors of stress concentration established for various radii of the fillet. By using the Herz theory the local stresses at the surface of contact of two teeth in mesh are discussed and it has been shown that the most unfavorable conditions take place at some depth beneath the surface of contact. Equations are given for calculating the deflection of teeth and it is shown that this deflection is usually less than the inaccuracies in commercial gears.

Gear Standardization Work Is Active

PROGRESS in the work of technical standardization was reflected in the reports of the 12 subcommittees of the association's general standardization committee, which is headed by B. F. Waterman of the Brown & Sharpe Mfg. Co.

The work of these committees was generously commended by President Frost in his address of welcome, abstracted in part elsewhere. "We owe much to Mr. Waterman, his various chairmen and their loyal workers," he said. "We should, and do recognize the support rendered by the Brown & Sharpe Mfg. Co., and many other concerns who are willing to 'grub stake' the industry by permitting their representatives in the A. G. M. A. to take time to do this work, trusting the future to make returns to them in bettered manufacturing conditions and a more stable industry. It is fortunate indeed that the old, self-centered, suspicious and egotistical manufacturer is fast being replaced by a new type whose business horizon can compass something for the other fellow as well as for himself."

The necessarily slow progress of the technical standardization work was also commented on in the president's address. "Where so many minds have to meet, where the rule of give and take play so important a part, and where, after we have satisfied ourselves, it is yet necessary to reach an agreement with the American Engineering Standards Committee, in order that what we do may have the widest acceptance, it is obvious that patience must be exercised," said Mr. Frost.

Reports by the association's representatives on the standardization and research committees of other organizations were given at the first general session. The report of the A. G. M. A. sectional committee of the American Engineering Standards Committee was made by B. F. Waterman. At a meeting of that committee, planned for the near future, nomenclature, materials and helical gears will be discussed. The materials committee held a meeting in Pittsburgh on May 17.

"Influence of Error and Elasticity on Strength of Gear Teeth" was the title of a progress bulletin (No. 2) of the A. S. M. E. special research committee on gears, which was read by E. W. Miller, chief engineer of the Fellows Gear Shaper Co., Springfield, Vt., and representative of the A. G. M. A. on that committee. The report gives the logs of the first series of tests on gears, conducted on the special Lewis machine at the Massachusetts Institute of Technology, for the purpose of determining the effects of different types of errors in gear tooth profiles on the strength of gear teeth.

Horsepower Formula for Non-Metallic Gears

Practice recommended by the non-metallic gearing committee, of which F. G. Sorensen, Cincinnati Gear Co., Cincinnati, is chairman, for computing the horsepower of non-metallic spur gears composed of laminated phenolic materials or rawhide, was accepted. The same practice was previously submitteed by the committee but was not accepted at that time because of the velocity factor. This hp. formula is based on the Lewis formula and the safe working stress for

static load is placed at 6000 lb. From this the safe working dynamic stress is found by multiplying by the velocity factor. In the absence of experimental data as to how the strength of the teeth of gears of these materials varies with speed, it was decided to use the velocity factor which has been common for cast iron. It is expected, however, as a result of tests to be conducted at the Massachusetts Institute of Technology with the Lewis machine that this velocity factor may be improved.

In the report of the spur gear committee which was presented by D. T. Hamilton, Fellows Gear Shaper Co., Springfield, Vt., it was stated that item No. 2 of their program has been in hand and will be reported on at the next meeting. This item relates to the preparation of a standard spur gear for general industrial use, by means of a diagrammatic illustration of various types of spur gears. This will include a spoked wheel, a webbed wheel and a solid pinion, with proper formula covering width of face, rim, arm and hub proportions in connection with other committees. Work is being done on standardization of tooth forms, on inspection and also on tolerances for spur gears. Item 4 of this committee's program, which calls for investigation of allowable stress for A. G. M. A. standard materials is being considered in conjunction with the metallurgical committee.

Metallurgical Committee Getting Data on Hardness

The metallurgical committee, which is headed by Chester B. Hamilton, Jr., president of the Hamilton Gear & Machine Co., Toronto, Canada, has been active. A questionnaire relating to specifications of hardness limits which will be acceptable when purchasing bars, forgings or castings of various chemical specifications has been sent to members of the association.

The steel casting specifications have been completed and are about to be passed by sub-committee No. 8 of the sectional committee on the standardization of gears, American Engineering Standards Committee.

Forged and rolled steel was the subject of a questionnaire sent out prior to the last meeting. The raising of the lower limit of the manganese without increasing the upper beyond 0.60 per cent was suggested. The questionnaire also related to introducing a control factor in the case of 0.40-0.50 per cent carbon steel used for water quenching (S. A. E. 1046), to limit the combined manganese and carbon to 1.05 per cent maximum and 0.85 per cent minimum. The reaction to both proposals was said to be favorable, but the action of sub-committee No. 8 on gear materials has been delayed because of a change in the personnel of the sub-committee. It is however scheduled for early action.

The work of the nomenclature committee, the chairman of which is D. T. Hamilton, is regarded as of fundamental importance. Considerable work has been done in endeavoring to overcome objections raised at the last meeting to the symbols assigned to those of the 87 names of elements which have dimensional value. Two plans were sent to the membership, the plan meeting favor with most members replying being discussed. No action was taken at the meeting, the plans being referred back to the committee pending the action of the sectional committee.

The tooth form committee, headed by H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., reported progress. The German 20-deg. full depth of tooth proposal has been taken up, and it was said that while the general proportions are the same as now used in this country, the committee has criticized their modification of the addendum and dedendum of the tooth form. It is planned to propose an American full depth of tooth, 20-deg. pressure angle at the next meeting.

Relative to the modification used on generating hobs as made in this country, it was stated that much work has been done and that the prospect is bright for a proposed basic hob form which should satisfy the various cutter makers. The committee is also working on a table for 14½-deg. full depth of tooth pinion diameter enlargement similar to the herringbone gear, 20-deg. table. It was stated that the 14½-deg. composite system full depth of tooth adopted by the A. G. M. A. at the last meeting, as well as the 20-deg. stub tooth involute system is being issued as a proposed tentative American standard on spur gear tooth forms by the sectional committee on the standardization of gears.

Progress was reported by J. C. O'Brien, Pittsburgh Gear & Machine Co., Pittsburgh, chairman of the worm gear committee. This committee started out to standardize dimensions of a group 11 worms used in the general industrial range. They have the dimensions for the manufacture of these worms worked up in tabular form. The committee is now getting data for horsepower ratings and plans to make definite recommendations on at least part of that program at the next meeting. When that is completed the subject of shaft worms will be taken up.

Suitable sizes of keyways for various shaft sizes are being worked on by the keyway committee, the chairman of which is R. B. Zerfey, engineer, Tool Steel Gear & Pinion Co., Cincinnati. It was suggested that the tentative American standard developed under the A. E. S. C. and sponsored by the A. S. M. E. should be adopted as a basis for future work.

A horsepower chart has been worked out by the herringbone gear committee and will be presented at the next meeting. The chairman of this committee is A. F. Cooke, Fawcus Machine Co., Pittsburgh. In connection with the progress report of the bevel and spiral bevel gear committee, F. E. McMullen, Gleason Works, Rochester, chairman, stated that a 1926 edition of the Gleason book on standardized tooth proportions for generated straight bevel gears was available.

Progress reports were also made by W. H. Phillips, R. D. Nuttall Co., Pittsburgh, chairman of the electric railway, mill and mine gear and pinion committee; by G. M. Bartlett, Diamond Chain & Mfg. Co., Indianapolis, chairman of the sprocket committee; by S. O. White, Warner Gear Company, Muncie, Ind., chairman of the differential-transmission committee, and by F. G. Eppley, Albaugh-Dover Mfg. Co., Chicago, chairman of the inspection committee.

Research Graduate Fellowships

To promote engineering research and the development of qualified research men, the University of Wisconsin, Madison, has established three research fellowships in the College of Engineering. Each fellow will be appointed for two years, at $900 for the first year and $1,100 for the second. He will devote not less than half his time to assigned research work in the college, but will be given opportunity to complete his work for the M.S. degree within the two-year period.

Candidates must be graduates of engineering colleges of recognized standing, and should preferably have had one or two years' graduate study or teaching or engineering experience. Applications for these fellowships for the year 1926-27 are now invited. F. E. Turneaure is dean of the College of Mechanics and Engineering.

Reinforcing Rusted Girders by Applying Concrete

Old steel girders, when reinforced with concrete, can be made to carry far more than the load of the original new girders, according to the results of tests conducted recently at Ohio State University, Columbus, Ohio, under the supervision of Professors Clyde T. Morris and J. R. Shank. The purpose of the tests was to determine the increase in strength which could be obtained by coating old, badly rusted steel girders with concrete applied with a cement gun. Condemned beams, which had been weakened to 70 per cent of their original strength, were found after treatment to be strengthened to a marked degree. It is believed that viaducts and bridges can be repaired by the new method in a much shorter time than at present.

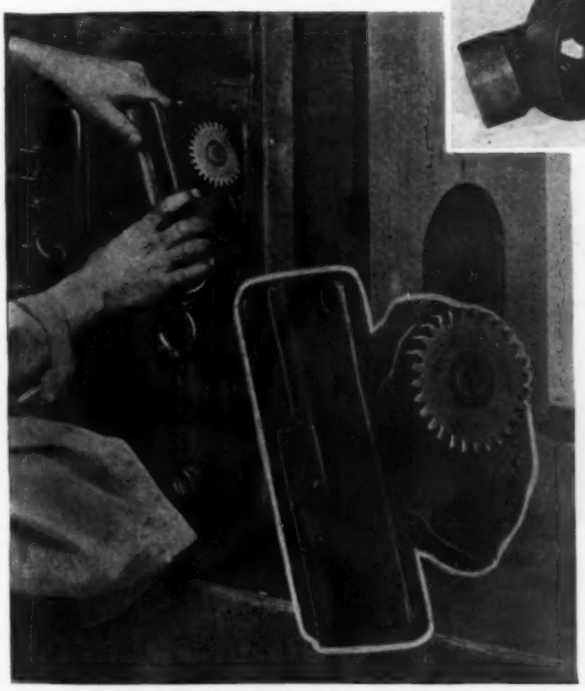
NEW LARGE MILLER

Power Rapid Traverse in All Directions and Duplicate Feed Control Levers Are Among Features

POWER rapid traverse in three directions, Timken roller bearings, new coolant and lubricating pumps, duplicate feed levers, a new type of feed box and improved universal joint shafts are among the features of a new No. 4 milling machine brought out by the Kearney & Trecker Corporation, Milwaukee.

Power rapid traverse is provided not only for the table, but for the saddle and knee as well. It is possible to traverse the table longitudinally in either direction at the rate of 150 in. per min., the saddle in or out at 70 in. per min., and the knee up or down at the rate of 50 in. per min. All power rapid traverse movements in any direction are conveniently controlled from the front of the machine. The engagement is through a multiple-disk friction clutch, designed to be smooth and quiet in operation.

Power Rapid Traverse Movements Are Controlled Conveniently from the Front. Joint forks are connected in a bronze drive ring covered by an outer steel shell. The lubricant pump is integral with the cover plate and may be conveniently removed by taking out the four cover plate screws as shown below



There are two separate automatic pumps on the machine. A pump for providing flooded lubrication for all gears and bearings inside the column and feed box is located on the left side of the column, as one faces the machine. It is directly above a filler cap and sight level gage. All that is necessary to remove the pump from the machine is to remove four cover-plate screws. The cover plate, of which this pump is an integral part, has drilled into it from either end the intake and outlet passages for the oil. Therefore, when the plate is removed, the pump comes out with it and is totally disconnected without having to break a single pipe joint.

A cutter coolant pump is located on the right side of the column at the rear of a reservoir marked "cutting compound." This pump is driven by the vertical shaft from the feed box, and by a convenient clutch lever may be rendered inoperative when milling cast iron or other materials that do not require coolant for the cutters. The intake and outlet connections for the cutter coolant pump are similar to those for the lubricant pump. This pump may also be disconnected and removed from the base of the column without breaking any pipe joints.

The table has a working surface of 19 in. x 76 in., and it is not cored out but is machined all over. Ample facilities are provided for the return of the cutter coolant. There are six oil screens, one in each end, and in addition, two at the front and two at the back of the table.

Practically the entire machine is automatically lubricated with but three filling stations, as follows:

1. Automatic flooded lubrication for all gears and bearings in the column and feed box.
2. Splash lubrication for all rapidly moving parts in the knee.
3. Wick oiling for table and saddle parts and bearings.

Has Duplicate Feed Control Levers

There are duplicate table, cross, and vertical feed control levers, located at the front of the knee and left rear of the table. This is convenient when milling a large piece of work, as it enables the operator to stand in back of the table in clear view of the milling cutters and completely control his machine. There are also duplicate control levers for starting and stopping the machine, which engage the main drive multiple-disk friction clutch. The contact in this clutch is metal to metal, being between alternate phosphor bronze and hard saw steel plates, running in oil. The same type of clutch, only smaller in size, is located inside the splash lubricant chamber in the knee, and engages all power rapid traverse movements.

Feed Box of Sliding-Gear Transmission Type

The machine is provided with 18 changes of feed in either direction, ranging from ⅝ in. to 25 in. per min. The feed box is of a new design of the sliding gear transmission type. All gears are heat-treated and hardened, and run in oil supplied by the same auto-

matic flooded lubrication system that pumps the oil to all gears and bearings inside of the column. The feed box is located at the rear of the column where there was ample room to construct it of generous proportions and where it is readily accessible at all times. The feed change levers are operated from the left side of the machine from the same position at which the operator stands when changing speeds.

Instead of pinning the joint forks to a swivel block in the center, the joint connection is into a ring consisting of an inner bronze drive ring covered by an outer steel shell. This bronze and steel ring is larger in diameter than the universal joint shaft itself. Each joint fork has an oil passage drilled into it which leads through the pin into an oil groove on the inside of the steel ring. There are oil pockets inside of the feed box and also inside the splash lubricant chamber in the knee, which provide a "head" of oil above each end of both universal joint shafts. The oil flows down into the joint fork and is carried by centrifugal force into the ring, thus keeping the connecting pins automatically lubricated at all times.

For standard motor drive, which it is estimated will be required for 90 per cent of the installations, the motor is placed in the base of the machine. The driving pinion and idler gear are located in the main column of the machine, where they are automatically lubricated. The three initial high-speed gears in the spindle drive, starting with the motor pinion, have ground teeth.

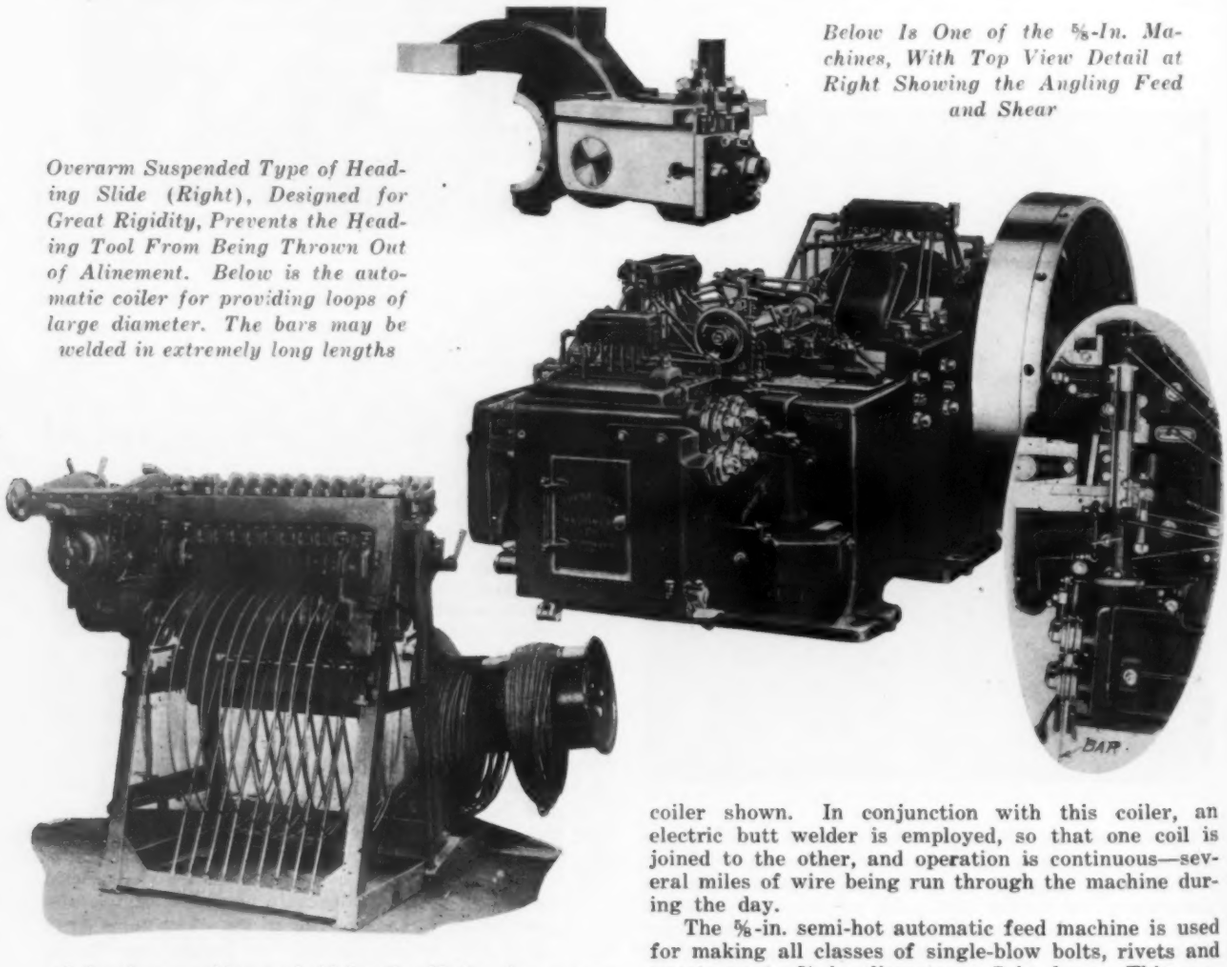
The new No. 4 machine is furnished in three models —plain, universal and vertical. The normal range is 42 in. x 14 in. x 20 in., but any model can be furnished with a standard long table, giving an increased longitudinal feed of 52 in. The weights range from 10,800 lb. in the plain to 12,400 lb. in the universal machine.

Semi-Hot Automatic-Feed Bolt-Heading Machines for Small Sizes

Demand for a smaller size of semi-hot automatic feed header for making machine and other bolts caused the National Machinery Co., Tiffin, Ohio, to bring out two macnines rated at ⅜ in. and ⅝ in., respectively. They were first demonstrated at the second exposition of forging machinery, held by the National company. The previous machine, handling 1-in. sizes, has had about five years of test.

The ⅜-in. machine makes a wide variety of single-blow work, up to ⅜ in. diameter x 4½ in. long, by the semi-hot method. Many jobs, which in a cold header require two blows, and sometimes three blows, are made on it with a single blow. Outputs, hence, are attractive, as the machine has a speed range of 150 to 200 r.p.m., and, with long runs of a size, work can be made from coil stock. In this design single feed rolls of large diameter are used in place of the double rolls in the larger machines.

A long furnace with a heating chamber of small section is employed. The stock, before passing through the furnace is taken off the original coil and looped or rewound into coils of large diameter by the new coiler shown. In conjunction with this coiler, an electric butt welder is employed, so that one coil is joined to the other, and operation is continuous—several miles of wire being run through the machine during the day.



Below Is One of the ⅝-In. Machines, With Top View Detail at Right Showing the Angling Feed and Shear

Overarm Suspended Type of Heading Slide (Right), Designed for Great Rigidity, Prevents the Heading Tool From Being Thrown Out of Alinement. Below is the automatic coiler for providing loops of large diameter. The bars may be welded in extremely long lengths

The ⅝-in. semi-hot automatic feed machine is used for making all classes of single-blow bolts, rivets and upsets up to ⅝ in. diameter x 7 in. long. This machine has a speed range of 120 to 150 r.p.m., and is a size especially adapted for covering a range of medium size work made heretofore both by the hot and cold methods.

The semi-hot method gives a clean, well finished product at low heating cost. It shows big advantages over the cold header in that a cheaper stock can be used; work is made in one blow that frequently re-

quires two or three blows cold, and the cost of heating is less than the annealing cost on cold-headed work.

Design of Machines

One feature is the extremely short and massive bed frame used. These machines weigh more per square foot of floor space occupied, and occupy 30 to 40 per cent less floor space, than former machines of equal rated capacity. The heading slide is unusual, being of greater length than the distance from the main shaft to the breast plate of the machine. This overarm suspended type slide is shown. The slide has bearings back of the crank also. This back bearing in reality guides the front end of the slide, and prevents the heading tool from "winking" or being thrown out of alinement, when making bolts or other jobs requiring a large amount of stock. The bearings are at the top of the slide, out of the zone of scale and water.

Another important factor in maintaining good alinement on the heading tool is the bolster plate construction. The heading tool is clamped in position with a degree of rigidity impossible in the old tool holder construction and, as various lengths of bolster plates are furnished with the machine, the heading tool is always supported firmly and does not overhang, even when making the shortest work. The bolster plate is screw controlled in all directions, permitting quick and accurate alinement of the heading tool with the grip dies, an advantage which has reduced die setting time to such an extent that users find it profitable to set up this automatic feed machine for runs as low as 1000 pieces.

Another inset shows the angling feed and shear employed in this semi-hot design. This arrangement is to prevent drag of the stock and to make it practically certain that the stock will be centered in the head. To increase the range of the semi-hot machine so as to include U.S.S. square and hexagonal head machine bolts, special track bolts and other jobs requiring a large amount of stock, the new angular shearing mechanism was designed. Patent has been applied for. This angling shear compensates for the distortion caused in shearing and makes it possible to upset and fill out an increased amount of stock for large or other special heads.

An adjustment for varying the gripping time to suit various classes of work is provided, so that on work requiring minimum gather the heated stock is gripped only a sufficient time to make the upset; whereas, where the job requires a large amount of stock in the head, the gripping dies are regulated to hold the stock longer. This helps to promote die life.

A new type of patented grip relief mechanism is employed which, while providing all the gripping pressure required for the most difficult work, limits the ultimate pressure obtainable, so that the working faces of the gripping dies cannot be hammered or battered and prematurely worn out. This results in a marked increase in die life—three to four times that secured heretofore. This reduces the number of die changes necessary and correspondingly increases production.

An automatic trip in the feed rolls causes the rolls to part and stop feeding, in case a sticker gets between the dies. In preventing an accumulation of bent and twisted stock in the grips, this automatic trip overcomes shutdown and saves many hours for productive work.

The gripping toggles in this design are placed horizontally, as this permits extra large diameter pins to be used and yet keeps the design compact. At the same time it permits of generous lubrication, as both ends can be reached by the automatic oilers. The automatic oiling system not only insures continuous lubrication to 57 bearings, but it means about 30 min. saved per day in hand oiling. These automatic oilers, in conjunction with the suspended type bearings and the large toggle, have given this design great resistance to wear, as four years' operation have left the header still in good condition.

Special attention has been given to features which simplify operation, reduce delays and assist in quick die changes. Not only is the bender or straightening device adjustable without stopping the machine, but the stock gage is arranged so that adjustments can be made without shutdown. To assist in maintaining high speed, the main shaft is counterbalanced and all unnecessary weight removed from reciprocating parts —all of which are steel. A new type ejector (patented) pushes the work from the dies, rather than kicks or knocks it out. Thus gravity has time to clear the work from the dies with the ⅜-in. machine running at speeds up to 200 r.p.m.

New Wrenches of Chrome-Molybdenum Steel

Tappet and check nut wrenches of chrome-molybdenum steel, heat treated, have been added to the line of J. H. Williams & Co., Buffalo. The tools are intended for use in adjusting tappets and are adapted also for use on check nuts. Light weight as well as unusual strength are features stressed, the heads and the jaws being of thin section. The tool is designed as to length to prevent burning of the hands while working on tappets when the motor is hot. It is nickel finished, with heads buffed bright.

Offers Fellowships in Metallurgy

A number of research fellowships in metallurgy are available at the University of Wisconsin. The Fellows are to carry on metallurgical research in iron and steel and will be given an opportunity to work for a master's or a doctor's degree. A good reading knowledge of French and German is very desirable, and applicants should hold a bachelor's degree at least.

Applications should be accompanied by certified abstracts of the academic work done by the applicant, by a statement of practical experience, copies of letters of recommendation, and a small recent photograph. The stipends are $1,200 yearly with a vacation period of one month. Fellows holding these fellowships will begin work in September, 1926. Further information may be obtained from E. R. Shorey, assistant professor of mining and metallurgy, Madison, Wis.

Takes Over Chattanooga Coal and Iron Interest

The Southern States Iron & Coal Corporation, recently incorporated in Delaware, has taken over the assets formerly owned by the Chattanooga Iron & Coal Corporation, consisting principally of the Chattanooga blast furnace, Chattanooga, Tenn., bee-hive and by-product coke ovens at Dunlap, Tenn., and iron ore mines at Estelle, Ga.

What Railroads Will Spend This Year

Capital expenditures in 1926 for new rolling stock and other railroad improvements will run between $750,000,000 and $800,000,000, according to an estimate of the Bureau of Railway Economics. Capital expenditures made during the first three months this year for equipment amounted to $74,900,000, a decrease of $22,800,000, compared with similar expenditures for the first three months last year. Capital expenditures, however, for locomotives amounted to $18,300,000, an increase of $5,600,000 over the same period in 1925. For roadway and structures, capital expenditures for the first three months this year amounted to $90,800,000, an increase of $19,200,000 compared with the first three months last year.

Jones & Laughlin Steel Corporation has authorized Dwight P. Robinson & Co., New York, to prepare plans and specifications for a new 18,000-hp. boiler plant at its Aliquippa Works.

METALS UTILIZATION

National Committee Formed to Eliminate Waste —Simplified Practice a Big Factor

WASHINGTON, May 18.—Formation of the National Committee on Metals Utilization* was completed at a meeting here on Thursday of last week under the auspices of the Department of Commerce, which had for its object a more effective elimination of waste in the metal trades through coordination of efforts of various technical, scientific, trade and other organizations. Secretary Hoover, as chairman of the committee, presided at the meeting, which was attended by representatives of more than a score of interested bodies. A definite program of action was adopted.

It calls for a plan of organization which will be followed by an extensive survey of what is being done in trade organizations, what can be accomplished and cooperation that can be given by other groups looking to advancement of the waste elimination program of the National committee. Where no such program is in effect, the survey will seek to determine whether such programs should be considered and what problems should be taken up. It then will seek to cooperate in setting up committees in trades which have no committees at work.

What It Is Proposed to Do

Achievements in the field of simplification of trade practices and specifications, work toward a directory of simplified commodities and broadening of waste elimination were outlined by W. C. Wetherill, Director of Metals Utilization, who has been spending months in preliminary work in this field. R. M. Hudson, Chief of the Division of Simplified Practice, explained accomplishments in reduction of variety and dimensions in the elimination of waste and outlined the effect of this work in relation to the metals field. Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, discussed the elimination of waste in foreign trade, with particular reference to methods and practices in distribution.

Mortimer B. Lane, editor of *Survey of Current Business*, outlined the progress made in the application of statistics compiled by the Census Bureau in advancement of business and in the elimination of waste arising from booms and slumps. Results of a survey of specifications were presented by P. H. H. Dunn, research expert, who has examined some 2500 specifications dealing with 125 commodities in the metals field. Existing standards prepared by standard-making bodies, it was stated, are not being used to the degree which their excellence warrants, despite the fact that they are designed to cover all normal needs. Dr. A. S. McAllister of the Bureau of Standards told of special activities of the bureau in cooperation with industry.

Among those in attendance were the following members:

Herbert Hoover, Secretary of Commerce, chairman; W. Chattin Wetherill, Department of Commerce, director; Edwin W. Ely, Department of Commerce, assistant director; E. E. Hunt, Department of Commerce, secretary; A. J. Berres, representing Metal Trades Department, American Federation of Labor, Washington; Fred B. Crosby, Morgan Construction Co., Worcester, Mass., American Institute of Electrical Engineers; R. H. Dalgleish, American Electric Railway Association, Capital Traction Co., Washington; Ernest F. DuBrul, National Machine Tool Builders' Association, Cincinnati; A. P. Hickcox, National Association of Purchasing Agents, Scovill Mfg. Co., Waterbury, Conn.; Thomas B. Howell, National Retail Hardware Association, Virginia Retail Hardware Association, Richmond; Ray M. Hudson, chief, Division of Simplified Practice, Washington; Dean Dexter S. Kimball, American Engineering Council, College of Engineering, Cornell University, Ithaca, N. Y.; C. E. Skinner, American Engineering Standards Committee, Westinghouse Electric & Mfg. Co., Washington; B. J. Kough, National Association of Farm Equipment Manufacturers, John Deere Plow Works, Moline, Ill.; J. E. Linabury, National Automobile Chamber of Commerce, Works Managers' Committee, General Motors Corporation, Detroit; Charles M. Manly, American Society of Mechanical Engineers, New York; Paul T. Norton, United States Chamber of Commerce, president, Case, Crane & Kilbourne Jacobs Products, Columbus; Harold C. Smith, National Metal Trades Association, president Illinois Tool Works, Chicago; S. Wells Utley, American Foundrymen's Association, vice-president Detroit Steel & Castings Co., Detroit; F. M. Waring, American Railway Association, engineer of tests, Pennsylvania Railroad, Altoona, Pa.; Nathan B. Williams, temporary alternate for National Association of Manufacturers of the United States, Washington.

Those present, but not members, included:

P. G. Agnew, secretary, American Engineering Standards Committee, New York; William J. Barrett, Group Policyholders' Service Bureau, Metropolitan Life Insurance Co., New York; Luther Becker, chief, Iron and Steel Division, Bureau Foreign and Domestic Commerce, Department of Commerce; Homer S. Fox, Minerals Section, Bureau of Foreign and Domestic Commerce, Department of Commerce; H. W. Gillett, Bureau of Standards, Washington; Dudley F. Holtman, National Committee on Wood Utilization; Mortimer B. Lane, editor, *Survey of Current Business*, Census Bureau, Washington; C. B. LePage, American Society of Mechanical Engineers, New York; R. C. Mayer, office of Secretary of Commerce; A. S. McAllister, Bureau of Standards, Washington; Lieutenant-Colonel W. A. McCain, U. S. A., War Department, Washington; J. S. McGrath, Mineral Section, Bureau Foreign and Domestic Commerce, Department of Commerce; Axel H. Oxholm, National Committee on Wood Utilization; Alfred Reeve, National Automobile Chamber of Commerce, New York; Major H. L. Rice, War Department, Washington; James A. Stader, United States Bureau of Mines; L. W. Wallace, American Engineering Council, Washington; A. B. Galt, H. R. Colwell, P. H. H. Dunn, J. S. Crews, A. V. Boullion, W. E. Braithwaite and E. L. Priest of the Division of Simplified Practice.

*Discussed on page 1356 of our issue for May 13.

New Officers of American Oil Burner Association

Officers and committees of the American Oil Burner Association for the ensuing year named at the meeting in Detroit last month, include the following: President, Lionel L. Jacobs, Foss Oil Burners of Canada, Ltd., Toronto; vice-presidents, John P. Loask, Peabody Engineering Corporation, 111 East Forty-second Street, New York; Edwin M. Fleischman, May Oil Burner Corporation, Baltimore; J. L. L. McCormick, Hardinge Brothers, 1770 Berteau Avenue, Chicago; J. C. Johnson, S. T. Johnson Co., Oakland, Cal.; R. S. Bohn, (dealer division) Preferred Utilities Co., 33 West Sixty-third Street, New York. Leod D. Becker, 350 Madison Avenue, New York, is executive secretary.

Mr. Jacobs, Mr. Becker and C. H. Chalmers, Chalmers Oil Burner Co., Minneapolis, form the executive committee. Nine directors were elected and members of the committees on simplification and standardization, new members, technical research, business standards and codes, convention papers, cooperation with heating industry, oil fuel and patents were appointed. The next quarterly meeting of the board of directors will be held in July at Toronto. At that time the convention city for next year will be selected.

Drop Forging Makers Meet This Week

The American Drop Forging Institute will hold a meeting at the French Lick Springs Hotel, French Lick, Ind., May 20, 21 and 22. Among the addresses announced are the following:

"The Drop Forge Industry" by H. G. Stoddard, vice-president and treasurer Wyman & Gordon Co., Worcester, Mass.

"Industrial Association Problems" by Charles J. Graham, president Nut and Bolt Association, Pittsburgh.

"Safety in the Forge Shop" by Mr. Kuechenmeister, personnel manager Dominion Forge & Stamping Co., Walkerville, Ont.

"Elimination of Waste in Industry" by W. Chattin Wetherill, director of Metals Utilization, Department of Commerce.

"Application of Metallurgy to Drop Forging" by Harold F. Wood, metallurgist Wyman & Gordon Co., Worcester, Mass.

"Forge Shop Production and Cost" by Frank D. Fuller, general manager Moore Drop Forging Co., Springfield, Mass.

"Steel Forging Indus... in Europe" by Dr. Stephen Koroco.

"Cost Problems" by P. T. Herdegen, president Dominion Forge & Stamping Co., Walkerville, Ont., and chairman of the cost committee of the American Drop Forging Institute.

L. W. Greve, president Champion Machine & Forging Co., Cleveland, is president of the institute and W. T. Johnson, 1001 Union Bank Building, Pittsburgh, is secretary. Arrangements for the convention are in charge of C. H. Smith, president Steel Improvement & Forge Co., Cleveland.

HONOR AMBROSE SWASEY

Cleveland Mechanical Engineers Tender Him Testimonial Dinner

Ambrose Swasey, chairman of the board of the Warner & Swasey Co., Cleveland, was honored with a testimonial dinner given by the Cleveland branch of the American Society of Mechanical Engineers at the Hotel Cleveland, May 14. About seventy-five of Mr. Swasey's friends were present. The principal speaker, Dexter S. Kimball, dean of the College of Engineering, Cornell University, and president of the American Engineering Council, paid tribute to Mr. Swasey's life and achievements. Messages eulogistic of Mr. Swasey were sent by Thomas A. Edison, Orville Wright, Herbert Hoover, Charles M. Schwab and others. A testimonial bound in leather and signed by eighty Cleveland friends was given Mr. Swasey. It read in part:

> We acclaim you as a fellow citizen, a great mechanic, a real thinker, an engineer, scientist, manufacturer and business organizer. More deeply do we appreciate your generous gift to engineering and scientific research, your interest in the propagation of the Christian faith, your constant efforts to help others help themselves, and the force of your example as an upright, kindly, God fearing citizen of a great country.

Mr. Swasey, who will be eighty years of age in December, was deeply touched by the tributes and in a brief response said he hoped he had done his bit to further the progress of science. "The future of science," he said, "was never greater than today and the amount of good that is being done by our scientific conventions and our technical journals is inestimable."

He spoke feelingly of his co-worker, Worcester R. Warner, with whom he founded the Warner & Swasey Co., maker of turret lathes and astronomical instruments. Mr. Swasey told how he and Mr. Warner started their careers years ago in a small machine shop in Exeter, N. H. Mr. Swasey is past president and honorary member of the American Society of Mechanical Engineers.

Southern Ohio Iron and Coke Association

The spring meeting of the Southern Ohio Pig Iron and Coke Association will be held at the Hotel Gibson, Cincinnati, on May 25. At the afternoon session Prof. Frank A. Ray, consulting engineer, Columbus, Ohio, will discuss the cooperative plan of sliding scale wages for bituminous coal miners, and J. P. Burton, president J. P. Burton Coal Co., Cleveland, will read a paper on "Sampling, Analysis and Reporting by Radio on Coal Mined at Our Kentucky Mines." "Testing of Coke" will be the subject of a discussion led by the members of the Committee on Standards.

Delegates will be appointed to attend the round table discussion on coke testing at the October meeting of the American Institute of Mining and Metallurgical Engineers in Pittsburgh. Following a dinner meeting, at which guests from the annual convention of the American Mining Congress will tell of new developments in coal mining, a motion picture on fluorspar mining and milling at Rosiclare, Ill., will be shown.

Purchasing Agents to Meet on Pacific Coast for First Time

LOS ANGELES, May 18.—An army of 200 men has been mobilized at Los Angeles, headed by W. W. Storey as general chairman, to handle the arrangements for the reception and entertainment for the 5000 or more delegates expected to come to Los Angeles for the annual convention of the National Association of Purchasing Agents, which will be held here at the Ambassador Hotel from June 9 to 12 inclusive. This will be the first convention this organization ever has held on the Pacific Coast.

An outstanding feature of the event will be the "Informashow" which will be held in the auditorium of the Ambassador Hotel. More than 100 of the exhibits which will be displayed will consist of the products of Los Angeles manufacturers, while the remaining 100 booths have been reserved for the displays of manufacturers of nationally advertised products.

More than 1500 delegates are expected from the far Western States, while the visitors from the East are expected to outnumber the Westerners by two to one.

Officers of Steel Treating Chapter

W. R. Klinkicht, Pollak Steel Co., was elected chairman of the Cincinnati Chapter of the American Society for Steel Treating at the annual meeting on May 12. Other officers chosen for the coming year are A. J. Lucas, Cincinnati Gear Co., vice-chairman; and Fred L. Martin, National Metal Trades Association, secretary-treasurer.

COMING MEETINGS

May

American Society for Steel Treating. May 20 and 21. Spring sectional meeting, Hotel Bond, Hartford, Conn. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

American Drop Forging Institute. May 20, 21 and 22. Annual convention, French Lick Springs Hotel, French Lick, Ind. W. T. Johnson, 1001 Union Bank Building, Pittsburgh, secretary.

Associated Machine Tool Dealers. May 20, 21 and 22. National Convention, French Lick Springs Hotel, French Lick, Ind. T. W. Carlisle, Strong, Carlisle & Hammond Co., Cleveland, secretary.

American Iron and Steel Institute. May 21, Hotel Commodore, New York. E. A. S. Clarke, 40 Rector Street, New York, secretary.

American Iron, Steel and Heavy Hardware Association. May 25, 26 and 27. Annual meeting, Atlantic City, N. J. Benjamin R. Sackett, 502 Arch Street, Philadelphia, secretary.

June

Society of Automotive Engineers. June 1 to 4. Summer meeting, French Lick Springs, Ind. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

National Association of Purchasing Agents. June 9 to 12. Eleventh annual convention, Ambassador Hotel, Los Angeles, Cal. W. L. Chandler, 233 Broadway, New York, secretary.

Railway Supply Manufacturers' Association. June 9 to 16. Exhibit in conjunction with meeting of Mechanical Division of American Railway Association, Young's Million Dollar Pier, Atlantic City, N. J.

Society of Industrial Engineers. June 16 to 18. Thirteenth national convention, Bellevue-Stratford Hotel, Philadelphia. George C. Dent, 608 South Dearborn Street, Chicago, executive secretary.

American Society for Testing Materials. June 21 to 25. Annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

American Society of Mechanical Engineers. June 28 to July 1. Spring meeting, Palace Hotel, San Francisco. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Management Association. June 30 to July 2. Production Executives' Division, Silver Bay, Lake George, N. Y. W. J. Donald, 20 Vesey Street, New York, managing director.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

THE present high rate of steel production is not likely to continue.

Finished steel markets seem to be facing a gradual decline.

Steel ingot production is about 14 per cent above present estimated normal requirements.

Pig iron production is approximately 21 per cent above estimated normal requirements.

Lower prices for iron seem to be in prospect.

DECIDED indications of recession are beginning to appear in the iron and steel business. On the whole, orders have fallen off, prices are weaker, concessions being made on smaller orders than formerly. Curtailment has begun and reports of intention to blow out furnaces have increased in number. The salient fact is that demand is dull and prices are weaker, notably in the case of the basic materials—scrap and pig iron.

The iron and steel markets, though weaker, have not yet been really tested. It is evident enough to the steel makers that under present conditions no considerable gain in new business would result from cutting prices. As usual in the steel business, the sharpest declines are likely to occur when larger orders are placed.

Evidently the old policy has been adhered to, namely, that of attempting to keep production costs down by keeping volume up. This is no longer possible, however, and, as volume is being curtailed, it may be inferred that overhead expenses and payrolls per unit of output will increase.

Our idea is that the readjustment now begun will probably be greater than that of last year. The indications are that we are beginning a cyclical downswing. Though this movement may be interrupted again in the fall by a period of recovery, a low bottom will probably be reached sometime before the end of 1927.

Production Ahead of Bookings

DEVELOPMENTS affecting steel during the past month are simple and quickly told. Production of steel ingots declined as usual in April, the decline being only a little more than the average. Accordingly, our adjusted index shows an almost imperceptible drop (see Fig. 1). The unfilled orders of the Steel Corporation fell off sharply, the decrease amounting to nearly 512,000 tons. At 3,868,000 tons, the unfilled orders were the lowest since September last year and closely approach the low point of recent years, reached in July, 1924. THE IRON AGE composite index of finished steel prices averaged 2.439c. in April, which is a little higher than in March, but in the week of May 11 it declined to 2.417c., which is the lowest since the last week in October, 1925.

The prices of most items of finished steel have been quite stable for a considerable period, in spite of the fact that production has been above the normal requirements of the country and unfilled orders have been declining. This situation has been possible because the price of steel is low and the margins between steel and both pig iron and scrap have been small. Furthermore, the activity and requirements of steel-consuming industries have been abnormally great.

The question now is—Can the prices of finished steel be maintained? The trend toward curtailment favors maintenance, but to the contrary there are the following developments: declining activity in steel-consuming industries, continued decline in unfilled orders, declining prices for pig iron and steel scrap, a declining level for general commodity prices. The probabilities, therefore, seem to favor a little lower average level for finished steel. Under present conditions a level at least as low as that in September, 1925, might reasonably be expected.

Heavy Pig Iron Output

THE pig iron situation differs materially from that of steel. In the first place, April witnessed a good sized increase in the production of pig iron, in spite of the fact that there is usually a decrease in that month. Consequently our adjusted index increased at about the same rate as in March and reached a point slightly above the January peak (Fig. 2). According to our estimates, pig iron production in April was more than 21 per cent above the normal requirements of the country.

In the second place, pig iron prices, instead of being rather stable, are obviously declining. The April average was $20.52 against $21.40 in March; in the week

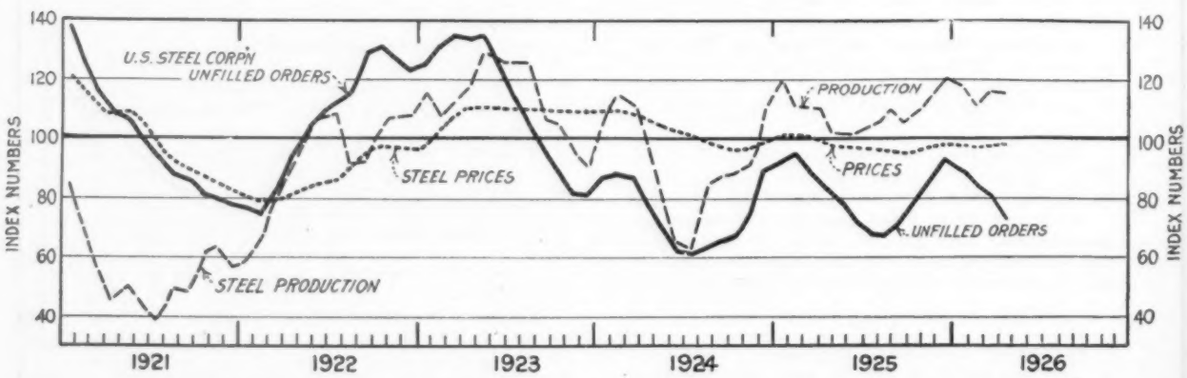


Fig. 1—In Conformity With the Usual Seasonal Decrease in Steel Ingot Production, April Output Showed a Moderate Downward Trend. Continued high consumption of steel prevented a sharp drop

In This Issue

Advocates that manufacturers be permitted to write off at least 25 per cent the first year for obsolescence of new machines.—Under present conditions the 10 per cent permitted by law is entirely too low, says gear association head.—Page 1427.

How much inspection should tool steels receive?—The answer depends on the money value of the part to be made. Ten per cent inspection will suffice for inexpensive parts, but nothing less than 100 per cent inspection should be given the steel for high-priced dies, tools, etc.—Page 1418.

No more infection from cutting oil.—Gear manufacturer discovers effective preventive of skin infection and hair follicle rash caused by cutting oils used on machines. Disinfectant, added to the oil, does not affect cutting qualities.—Page 1427.

Marmon cuts costs by "group payment" plan.—Instead of receiving piece-work rates, employees are compensated according to production of completed "pay units"; for example, a chassis, an engine, or a steering gear. Lower labor costs, increased production and improved morale result from the new plan.—Page 1405.

Can lean ore be beneficiated cheaply enough to sell in competition with better ores?—As yet, an unanswered question, says expert. Discovery of an economical method of beneficiation would greatly lengthen the life of the Lake Superior district, which now has an assured ore reserve of only 30 years.—Page 1409.

When is a cutting tool "dull"?—In testing tool steels Western Electric Co. eliminates guess-work by connecting a recording wattmeter in circuit with the motor driving the machine tool. The duller the tool, the more power is required to operate the machine. Thus a uniform "break down" point can be established.—Page 1420.

New blast furnace reduces labor to a minimum.—Inland Steel Company's new stack represents the last word in labor-saving devices, and is expected to make new low cost records.—Page 1424.

Can finished steel prices be maintained?—With production ahead of bookings, economist declares that a little lower average price level is probable.—Page 1436.

Even though idle part time, single-purpose tools are more economical.—Automobile manufacturer finds that "one-operation" machines keep his production costs at the low point.—Page 1406.

What will become of terne plate?—Sales are steadily declining, and manufacturer prophesies the market will disappear entirely within 10 years unless new uses are found.—Page 1415.

New type of continuous annealing furnace is open at the bottom.—The tops of the cars form the bottom of kiln. Thus car wheels and bearings are not subjected to high temperature, and may be repaired while cars are in furnace.—Page 1410.

How shall sheet seconds be disposed of?—The suggestion is made that manufacturers allot a certain percentage of seconds to distributers when prime sheets are ordered.—Page 1415.

Savings are made by having raw materials delivered directly to the department which will use them.—In the Marmon plant only one-tenth of the incoming raw materials goes to general receiving department. Stock clerks have been reduced from 120 to 30.—Page 1406.

Are lower pig iron prices in prospect?—Iron output is 21 per cent above estimated requirements, says Dr. Haney. He expects further weakness in pig iron markets, despite present low margin of profit to producers.—Page 1439.

American sheets are far superior to foreign make.—In one foreign mill 90 per cent of sheets accepted as prime would be classed as seconds if made here, sheet maker declares.—Page 1415.

Unwisely edited employees' magazine injures morale.—Admission of caustic and untrue "personal" items in plant news publication have effect exactly opposite to that for which the paper was established.—Page 1445.

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The Call for Convention Reporting

AGAIN the high convention season is on. Again is a large part of each issue these weeks given over to reports written to pass on to readers the important details as well as the high lights of the meetings, so that the convention pictures will be complete for both absentees and participants.

There is also the reader whose activities are in another, though more or less parallel line. He is entitled to facts and observations likely to help him in his business. The year's round-up of association reports form a good record of technical and commercial progress.

For News Summary See Reverse Side

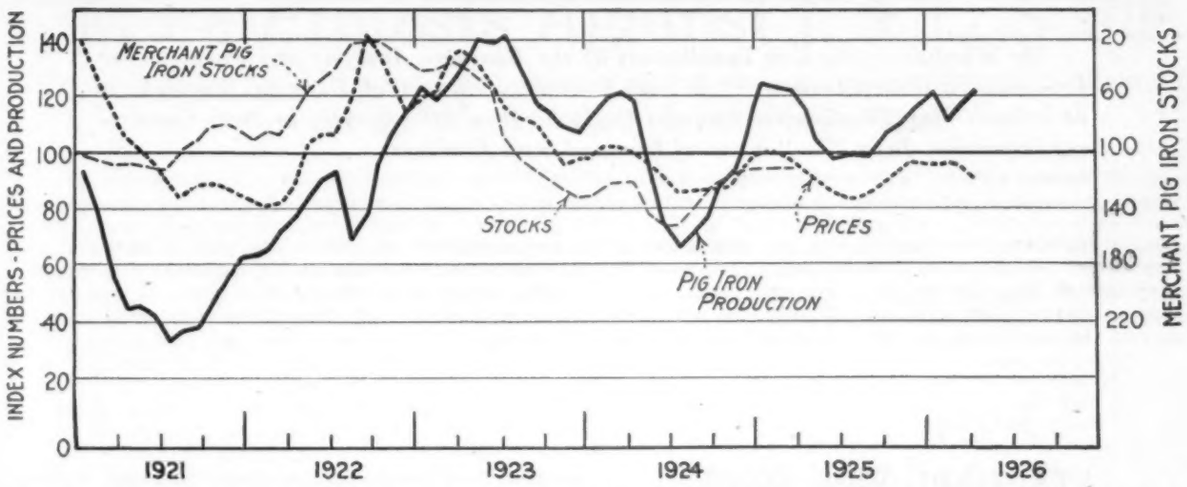


Fig. 2—Though the High Rate of Steel Production and Consumption Somewhat Justifies the High Output of Pig Iron, Over-Production Now Is Evident

of May 11 THE IRON AGE index declined to $20.29, which is the lowest figure since the last week in October.

Over-production of pig iron is clear. The output is considerably above the normal rate and *it is out of line with steel production, the ratio of the production of steel ingots to pig iron production having declined sharply last month.* It seems, therefore, that further weakness in pig iron markets is probable. This is the more likely because pig iron is a little high in price, when compared with either semi-finished steel or finished steel. Why should the price of pig iron not fall as low as it did last year? The general level of commodity prices is even lower than then and coke is nearing bottom levels.

Unsatisfactory Spread Between Steel and Raw Materials

ILLUSTRATED in Fig. 3, the present price structure may be summed up by saying that the spread between bars, billets and nails appears quite normal, but that the spread between the raw materials (coke and pig iron) and steel (semi-finished and finished) is unsatisfactorily small.

Down through April the prices of representative products covering the iron and steel industry showed a condition of stabilization. Black sheets, nails, bars, billets and coke were all unchanged during April; and nails, bars, and billets have been unchanged for several months. In several respects the situation resembles the latter part of 1923, when stability also existed. The price relationship between nails and bars is now the same and this is true also of pig iron and coke. In the earlier period, however, sheets were relatively higher and a greater spread existed between bars and billets. Both semi-finished and finished steels have been lower recently in comparison with pig iron and scrap than in late 1923.

In fact, steel prices are so low, when compared with the raw materials for that product, that it would seem desirable to curtail production sharply and thus enable the producers to hold prices fairly stable. In view of present market conditions it is certain that steel production will have to be considerably curtailed and held down for some time, if a decline in prices is to be prevented.

Even at present levels, pig iron is too high in comparison with steel. On the other hand, there is no more than a fair margin between coke and pig iron. The

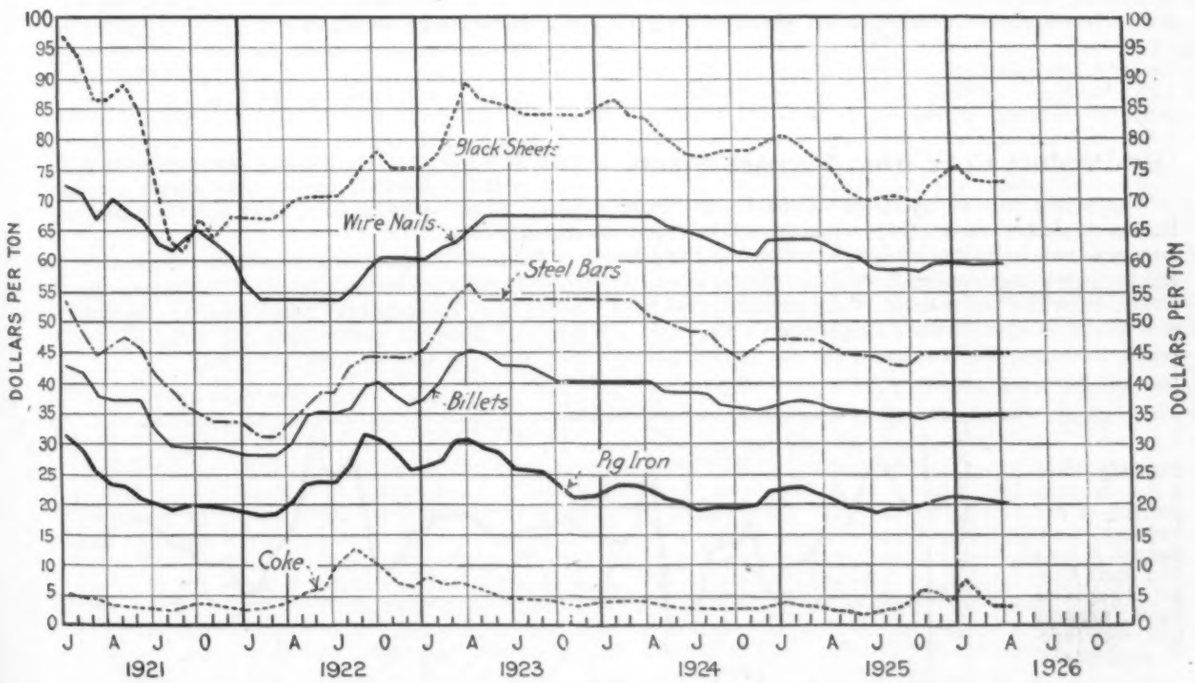


Fig. 3—The General Trend of Commodity Prices Has Continued Downward Since December. Steel prices are much nearer bed-rock than when sharp breaks occur. Their margin over raw materials is unsatisfactory

The schedule of the next installments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, is as follows:* ***May 27****—General Business Outlook;* ***June 10****—Activity in Steel Consuming Industries;* ***June 17****—Position of Iron and Steel Producers.*

natural question, therefore, is—Can pig iron prices go any lower? History clearly shows that this is possible, even though losses to the producers may result. It is only necessary to go back to early 1922, the late summer of the same year, the latter part of 1924, and the summer and fall of 1925 to find periods in which iron fell below a normal relationship with coke (see Fig. 3). While, therefore, lower pig iron prices do not appear to be justified by costs, they do seem required by market conditions.

STANDARD PIPE SIZES

Simplification of Wrought Iron and Wrought Steel Pipe, Valves and Fittings Recommended

At a meeting on pipe simplification, to be held at 10 a.m. on May 28, in the Commerce Building, Washington, the following items will be discussed:

1.—Sizes of wrought iron and wrought steel pipe, valves and fittings in common use.
2.—A recommended range of sizes for future practice.
3.—The possibility of using this recommended schedule as a basis for further simplification.

Producers and distributers of wrought iron and wrought steel pipe, valves and fittings believe that they are handling an excessive variety of sizes, and that certain sizes could be eliminated to advantage.

The Manufacturers' Standardization Society of the valve and fittings industry, through its sub-committee on simplification of product, has made a survey of current practice. The following tentative simplified practice recommendation has been proposed by that body for consideration and comment. The sub-committee states that this reduced list of pipe sizes will fill over 80 per cent of all normal requirements. The final recommendation as developed by the conference will primarily affect new production and new pipe installations. It will in no way interfere with proper servicing of existing installations. During the gradual passage from current practice to simplified practice, the final program will become progressively operative without having caused delays or inconvenience for any one.

Adherence to this simplified practice recommendation by manufacturers, distributers and users should produce desirable and appreciable benefits and should serve as a substantial start in establishing entirely satisfactory pipe standards.

Recommended stock sizes and dimensions of wrought iron and wrought steel pipe, valves and fittings. Random lengths to be according to present pipe mill practice.

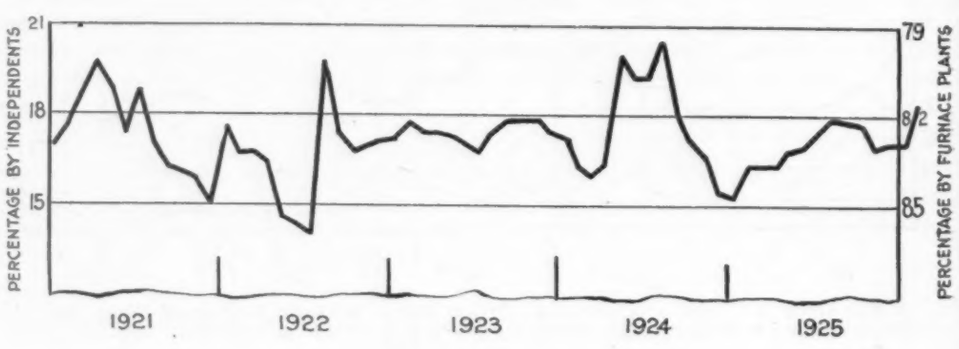
All Dimensions Are Inches

Nominal Size	Merchant Pipe (Standard) Outside Diameter	Extra Strong		Double Extra Strong	
		Inside Diameter	Outside Diameter	Inside Diameter	Outside Diameter
⅛	0.405	0.215	0.405	...	...
¼	0.54	0.30	0.54	...	...
⅜	0.675	0.42	0.675	...	...
½	0.84	0.546	0.84	0.25	0.84
¾	1.05	0.74	1.05	0.43	1.05
1	1.315	0.95	1.315	0.60	1.315
1¼	1.66	1.27	1.66	0.89	1.66
1½	1.90	1.50	1.90	1.10	1.90
2	2.37	1.93	2.37	1.50	2.37
2½	2.87	2.32	2.87	1.77	2.87
3	3.50	2.90	3.50	2.30	3.50
3½	4.00	3.36	4.00	2.72	4.00
4	4.50	3.82	4.50	3.15	4.50
5	5.56	4.81	5.56	4.06	5.56
6	6.62	5.76	6.62	4.89	6.62
8	8.62	7.62	8.62	6.87	8.62
10	10.75	9.75	10.75	...	...
12	12.75	11.75	12.75	...	...
..	14.00	....	....	...	...
..	16.00	....	....	...	...
..	18.00	....	....	...	...
..	20.00	....	....	...	...

By-Product Coke from Furnace Plants

One of the new compilations of the United States Bureau of Mines shows the percentage of by-product coke produced by plants associated with iron furnaces, and the percentage coming from other plants, month by month, from 1921 up to date. The furnace figures have been pretty consistent when considered on the basis of yearly averages, the maximum for the period having been 83.6 per cent in 1922 and the minimum 82.3 per cent in 1924. Monthly figures have shown a range between 86 per cent in July, 1922, and 79.5 per cent in August, 1924.

The accompanying diagram shows the monthly variation over the period mentioned. The diagram gives directly the "independent" percentage of the total production. Furnace percentages are obtained by inversion of the figures, as shown at right.



Monthly Variation in Proportion of By-Product Coke Output Made by Plants Connected With Blast Furnaces and by Independents

More Protests Against J. & L. Scale

Contend It Is Too High for Long Distances and Prejudices Pittsburgh in Favor of Chicago District—Tariff Errors Pointed Out

WASHINGTON, May 18.—Complaints against application of the Jones & Laughlin iron and steel rate scale are being received in increasing number by the Interstate Commerce Commission. The protests are being made informally, but some of them strongly urge suspension of the scale which the commission has ordered to become effective May 29. Among complaints received during the past week were those of the Jones & Laughlin Steel Corporation; the Chamber of Commerce of Cleveland, whose objections have been previously stated in THE IRON AGE; the National Tube Co., Pittsburgh; the American Rolling Mill Co., Middletown, Ohio; the United Alloy Steel Corporation, Canton, Ohio, and the N. & G. Taylor Co., Inc., Cumberland, Md.

Charges Scale Prejudices Pittsburgh in Favor of Chicago

A request that the rates be canceled, after hearing, is made by the Jones & Laughlin Steel Corporation, complainant in the case. It is pointed out that since the commission denied petitions for a reopening of the case the following changes have occurred:

> The rates from Chicago have been filed and suspended. (Reference is made to suspension of Illinois Freight Association rates filed under the J. & L. scale).
>
> At the time the Jones & Laughlin company filed its petition for reopening of the case, the carriers were proposing to apply the scale prescribed from Cleveland, Lorain, etc., advising the protestant that such action would be pursuant to a letter from the Director of Traffic of the Commission. The carriers have not applied the scale from said points, which are related to Pittsburgh, but which were not specifically mentioned in the report. . . . The carriers' act in limiting the revision to points specifically mentioned in the decision, while temporarily to this protestant's advantage, opens the way to complaints from the related points, and to a long period of litigation and uncertainty about rates and relations. Protestant believes that that course is detrimental to the interests of the steel industry as a whole, including protestant, and to the carriers and to the consumers.

Since the rates from Chicago were suspended, the Jones & Laughlin company asks for suspension of the rates from Pittsburgh. It is declared that the Illinois shippers and carriers will have the opportunity to present evidence with regard to the lawfulness of the rates from Chicago and other Indiana-Illinois points, an opportunity the complainants asks for with regard to rates from Pittsburgh.

An interesting feature of the Jones & Laughlin protest is a charge that the scale fixed by the commission unduly prejudices the Pittsburgh district and favors competing points in Indiana and Illinois, including Chicago.

Pointing to St. Louis as an important and typical destination, the protest states that the Chicago-St. Louis rate published under the scale is 22c., which, it is stated, is 80 per cent of 27.5c., the Fifth Class rate. But from Pittsburgh to St. Louis, it is explained, the protested rate under the scale is 40.5c., which is over 100 per cent of the Fifth Class Central Freight Association scale rate of 38.5c., and approximately 93 per cent of the effective Fifth Class rate of 43c.

Scale Declared Too High for Long Distances

Rates from Chicago, published by the carriers and now under suspension, it is contended, are less than they would be if the scale were strictly applied to actual mileage, as is substantially done from Pittsburgh. The actual short-line distance from Chicago to St. Louis is 283 miles, it is declared, for which the scale rate would be 24.5c., while the rate actually published is 22c. From Pittsburgh to St. Louis, the protest says, the actual distance is 612 miles and the scale rate would be 41c., against a published rate of 40.5c. It is assumed, the Jones & Laughlin protest states, that these departures from strict mileage between the points proper is due to group averages.

It is contended that the scale is too high for the long distances as compared with the short distances. The report says:

> If the scale were reduced to a graph, it would be found to start below other scales, approach those scales at distances 300 to 400 miles, then cross and rise above at distances around 600 miles. The effect of such an adjustment is obviously and necessarily to restrict the area in which a given producing point can distribute. Pittsburgh's greatest markets, for instance, are seaboard and Chicago-St. Louis and points west, basing on Chicago or St. Louis. To those markets, on this scale, Pittsburgh is held at full Fifth Class or higher. But competitors in eastern Pennsylvania shipping east and in Illinois-Indiana shipping west would get, under this scale, rates from 70 to 80 per cent of Fifth Class. Pittsburgh has been seriously handicapped by the existing adjustment of Fifth Class from Pittsburgh to these markets, as against approximately 60 to 65 per cent of Fifth Class from competing producers; that very situation was condemned in general terms by the commission, as to the territory west of Pittsburgh, by the (J. & L.) decision . . . but the scale prescribed as a remedy does not in fact accomplish a remedy.

National Tube Co. Points to Errors in Scale

The National Tube Co. declares that the tariff contains errors and inconsistencies. It points out that on the Baltimore & Ohio Railroad the scale rate to Cincinnati is 26c., but the rate published is 27c., being held up to Cottage Grove and Connersville, Ind. To Lawrenceburg, Ind., the Fifth Class rate is 30c., it is stated, and the scale would make 27c., while the rate published in the tariff is 32c. Going beyond that point to North Vernon, Ind., the Fifth Class rate is 31c., the scale 29c., while the tariff publishes 32c. These published rates, it is pointed out, are subject to intermediate application and the 32c. rate is, therefore, applicable to intermediate points and "is in excess of both the present Fifth Class and the commission's scale for actual mileage." Further, it is asserted that no rate is shown in the tariff to Peoria, Ill., the present Fifth Class rate to that point being 38.5c., but a rate of 36c. is said to be published to Pekin, Dwight and Chenoa on the Chicago & Alton. Peoria is located between these points and under the intermediate application the Pekin rate applies to Peoria, but only in connection with the Chicago & Alton. Through combination rates to Western Trunk Line territory and northeastern Oklahoma produced by use of the rate of 36c. to Peoria, plus local rates beyond, would make 1c. per 100 lb. less than combinations made on Mississippi River crossings, the National Tube complaint declares.

"It would, however, be very unsuitable and undesirable to route our very large tonnage to Western Trunk Line territory and northeastern Oklahoma via the Chicago & Alton Railroad through the Peoria gateway."

The National Tube Co. suggests that it might be well either to suspend the tariff or to have the carriers make the necessary corrections upon short time publications.

Contends New Tariff Increases Rate Discrimination

The American Rolling Mill Co. complained that Middletown and Zanesville, Ohio, and Ashland, Ky., with minor exceptions from Zanesville, for many years have been held to an Official Classification basis for transportation of iron and steel products within Central Freight Association territory, notwithstanding the fact that from numerous competing origins rates measurably lower than those under the Official Classification basis have been applied to substantial consuming areas in the same territory. It is charged that the carriers have not remedied this in the tariff, but instead propose to increase the alleged discrimination.

Discrimination against Canton, Ohio, in favor of

Youngstown and Pittsburgh is charged by the United Alloy Steel Corporation, Canton, in asking for suspension of the tariff.

The N. & G. Taylor Co., maker of tin and terne plate, contends that the new tariff will add to the advantages "already enjoyed by the complainant's competitors in the Pittsburgh district, and the removal of the recognized differential will take away the very slight advantage to which the complainant is justly entitled over competitors in the Pittsburgh district."

Retain Reduced Line of Steel Barrels and Drums

Representatives of manufacturers and users of steel barrels and drums, and of other organizations, meeting May 14 at the Department of Commerce under the auspices of the Division of Simplified Practice, reaffirmed action taken more than a year ago, reducing the number of varieties and sizes of barrels and drums from 66 to 24. The action was based on a survey of production during 1925, which indicated that 84 per cent of the 4,955,842 barrels and drums produced were in the simplified sizes.

Reaffirmation of the simplified practice recommendation without further eliminations was necessitated, due to the fact that sufficient information was not available to the standing committee as to the type of contents shipped in steel barrels and drums or the basis of weight, i.e., pounds or gallons.

Further Reduction to Come Later

The committee unanimously recommended surveys by the using organizations, as well as the manufacturers, during the next six months, to determine these factors. The results of these surveys will be compiled and used as a basis for further reductions in varieties.

The barrels and drums considered in connection with the simplified practice recommendation included standard light shipping drums, standard I.C.C. drums, friction cover light drums, bolted cover light drums and bilge barrels. No containers made of material of less than No. 19 gage were considered by the committee in its review of the recommendation. The committee comprises:

M. F. Crass, Grasselli Chemical Co. (Manufacturing Chemists Association), Cleveland; E. M. Lyons, Tiona Refining Co. (National Petroleum Association), Washington; William F. Pitt, Traffic Committee, Paint Manufacturers Association of the United States, Philadelphia; E. J. Allen, American Steel Package Co., Defiance, Ohio; C. T. Draper, Draper Mfg. Co., (Steel Barrel Manufacturers Association), Cleveland; G. A. Moore, Detroit Range Boiler & Steel Barrel Co. (Steel Barrel Manufacturers Association), Detroit.

Riley Stoker Reorganization

Fred H. Daniels, general manager Riley Stoker Corporation, Worcester, Mass., manufacturer of automatic mechanical stokers, has been elected president to fill the vacancy resulting from the death of Robert Sanford Riley, who founded the business in 1911. Aldus C. Higgins, treasurer of the Norton Co., has been made chairman of the board of directors, and James W. Armour, engineering manager, has been elected a member of the board of directors. The officers of the company now are: President, Fred H. Daniels; vice-presidents, Mr. Higgins and William Pestell of Worcester, R. T. Riley, Winnipeg, Manitoba, and S. A. Armstrong, Toronto, Ont.; secretary and treasurer, David K. Beach, Worcester; directors, Mr. Daniels, Mr. Higgins, Mr. Pestell, Mr. Beach, Charles L. Allen, president Norton Co., and George N. Jeppson, its works manager; Henry S. Pickands, Cleveland, and Mr. Armour.

Ever since the company was organized in 1911 Mr. Daniels has been closely associated with Mr. Riley in the business, having served first as secretary and afterward as vice-president and general manager. He is a graduate of the Sheffield Scientific School of Yale University and of the Massachusetts Institute of Technology. He is a son of the late Fred H. Daniels, chief engineer and a director of the American Steel & Wire Co. The company has become an important factor in the stoker and general combustion field. The management announces that the policies and principles which resulted in the company's rapid growth under the leadership of Mr. Riley will be unchanged.

Standard Pattern Colors

The American Foundrymen's Association has recently issued a circular showing the standard pattern colors adopted by the joint committee on pattern equipment standardization. The chart embodies the standard markings approved by the association and the cooperating societies. It is the hope of the sponsors and the joint committee that the recommended color markings will be followed by all producers and consumers.

Cooperative Apprenticeship Training for the Quad Cities

The district cooperative plan of training apprentices is to be tested by the so-called Quad Cities, which include Moline, East Moline, Rock Island, Ill.; Davenport, Iowa, and their suburbs. Last March the Tri-City Manufacturers Association and the Quad City Foundrymen's Association agreed to launch such a program and to use the resources of the International Correspondence Schools of Scranton, Pa. Early in April H. A. Frommelt, consultant of the apprentice training division of the International Correspondence Schools, established his headquarters in Moline with an assistant, Stanley M. Brah, a Marquette University graduate.

These specialists, and others associated with them, will make a survey of the various plants in the Quad Cities to enable them to draw up the necessary programs of training (consisting of shop and school schedules) suitable for individual plants or groups of plants. These schedules will be incorporated into suitable apprentice indentures. The necessary machinery will also be organized and put into operation that the program may become a reality.

Meanwhile the support of the entire community is being enlisted for the project. This must be accomplished by making the proper contacts through the schools, the school personnel, parent-teachers' organizations, and civic, social and religious organizations interested in the welfare of its juveniles.

Making Seamless Brass Tubing

Brass tubing, one of the outstanding products of the Bridgeport Brass Co., is made by a Mannesmann piercing machine, designed by engineers of the company. This was one of the features of a trip of inspection made recently through the Housatonic Avenue plant, Bridgeport, by 150 members of the local Chamber of Commerce.

In the loading end is placed a hot billet of brass. The machine forms a tube by spinning the solid billet between rolls over a pointed mandrel. The operation lengthens the tube, which is forced out over the bed, and is dropped to one side. Considerable attention was given this machine because of the rapidity with which it turned out tubing. Description of this process, as applied to steel, has appeared a number of times in THE IRON AGE, notably on Feb. 18 and March 11, last.

SHEET PRODUCTION AND SALES

Shipments and Output in Close Balance—But One-Fourth Over Sales

PITTSBURGH, May 18.—The report of the National Association of Sheet and Tin Plate Manufacturers for April shows that the close balance between production and shipments of sheets continues. Output for the month aggregated 294,811 tons, while shipments totaled 288,759 tons. The total number of hot mills given is 711, having a capacity for April of approximately 433,200 net tons, and the percentage of the capacity to which the figures are related is 74.9.

Sales of sheets in March amounted to 304,233 tons, while production was 319,132 tons.

Unfilled tonnage as of May 1 amounted to 472,448 tons, as against 534,641 tons as of April 1. Figures for April follow:

Statistics of Independent Sheet Steel Industry

	Net Tons	Per Cent of Capacity
Total sales for month	249,866	77.1
Total production	294,811	91.0
Total shipments	288,759	89.1
Unfilled tonnage as at May 1.	472,448	145.7
Finished stock on hand awaiting shipments	121,685	37.5
Stock unsold	62,604	19.3

Since the first of the year, sales have amounted to 988,523 tons, while production totaled 1,242,139 tons and shipments 1,232,893 tons. Accordingly in the four months, unfilled orders and stock unsold have decreased, output being about 25 per cent above sales. Roughly the indications are that unfilled orders now represent 45 days' operations, whereas on Jan. 1 they amounted to over 65 days.

Stanley Works Acquires American Tube & Stamping Co.

Negotiations which have been under way for some months have been practically concluded, for the acquisition of the entire assets of the American Tube & Stamping Co., Bridgeport, Conn., by the Stanley Works, New Britain, Conn. A statement to that effect has been given out by C. F. Bennett, president of the Stanley Works. At a meeting of the stockholders of the American Tube & Stamping Co. held at Bridgeport, May 17, it was voted to accept the proposition of the Stanley Works for the purchase of the stock of the Bridgeport company. The American Tube & Stamping Co. plants are located on a 50-acre tract of water front property. They consist of steel works (four basic open-hearth furnaces), hot rolling and cold rolling mills, and a pressed metal division. The products are steel billets, bands, hot and cold rolled strip, flat wire, stampings, etc. The annual capacity is 125,000 tons of ingots, and the finishing capacity is 100,000 tons of hot rolled products. The cold rolled department has a capacity of 50,000 tons.

F. Kingsbury Curtis, New York, is chairman of the American Tube & Stamping Co., and E. M. Johnston, Bridgeport, president and treasurer. The capital stock is $1,626,400 of preferred and $1,626,400 of common. There is a bond issue of $460,000.

The Stanley Works operates hoop and strip mills and a builders' hardware plant at New Britain, a hardware plant at Niles, Ohio, and a hot rolling mill at Bridgewater, Mass. The Bridgewater plant has a capacity of 35,000 tons a year of bands and hot rolled strips. The annual capacity of the New Britain works is about 100,000 tons of hot rolled strip and 60,000 tons of cold rolled strip, also 37,000 kegs of wrought steel punched washers.

Steel Rates from Youngstown to Buffalo Declared Reasonable

WASHINGTON, May 18.—Passing upon a complaint of the Concrete Steel Co. and other steel manufacturers, Examiner Arthur Kettler recommended in a tentative report made public last Saturday that the Interstate Commerce Commission find that rates on iron and steel products in carloads from Newtown Falls, Youngstown, and Niles, Ohio, to Buffalo and nearby points are not unreasonable. Dismissal of the proceeding is recommended also.

The Colorado Fuel & Iron Co. "Industrial Bulletin" of April 15 has the keynote "Getting Ahead Financially." Many of the employees gave their ideas on how best to accomplish this result. This was reinforced with the ideas of bankers and others, the whole filling a number of pages.

Seek to Adjust Complaints Against New Illinois Tariff

WASHINGTON, May 18.—The Interstate Commerce Commission last Saturday announced that a conference will be held here tomorrow before Commissioner Campbell relative to rates on iron and steel products carried in the Illinois Freight Association tariff which was filed under the Jones & Laughlin scale but was suspended because of protests from steel makers in Chicago Heights that the rates from Gary, Ind., into the Chicago switching district had been left unchanged. From other points near Chicago the rates were increased. It is the purpose of the conference to bring about an adjustment without proceeding formally. It is assumed that should the adjustment be made, the order of suspension will be vacated and the entire tariff for all the affected territory be allowed to go into effect on May 29, the effective date of the J. & L. scale in Central Freight Association territory.

Fire Clay Brick Is Lower

Prices of Pennsylvania, Ohio and Kentucky fire clay brick have been formally reduced $3 per 1000, the reduction becoming effective as of May 12, with most producers. As noted in THE IRON AGE of May 13, lighter demands were causing increased sales effort and some shading of prices and concessions in fire clay brick had become so common that there was no other course for manufacturers except to formally recognize the lower prices. Quotations on other kinds of refractories are holding at recent levels. Prices are given on page 1453.

Scrap Association Formed

CHICAGO, May 18.—An Iron and Steel Scrap Association, composed of scrap dealers and brokers in Chicago, has been organized, with offices at 122 South Michigan Avenue. The purpose of the organization, it is stated, is to eliminate unfair and unethical practices, clarify specifications, study production and handling costs and otherwise to promote educational investigations. Officers are: D. R. Cohen, president; Louis Popper, vice-president; Abraham Clonick, vice-president; Arthur M. Price, secretary and treasurer. The directors are Frank Parker, W. J. Ross, Jacob Lanski, Samuel Feinberg, Benjamin Kaplan, William Posen and Morton Teller.

The annual meeting and election of officers of the Eastern States Blast Furnace and Coke Oven Association will be held at the Edgewood Country Club, Pittsburgh, June 1. William H. Wright, vice-president and general manager, Foundation Oven Corporation, will present a paper on "The Plant of the Hudson Valley Coke & Products Corporation at Troy and the Foundation Oven."

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Steel Market on Safer Ground

OFTEN what is one's loss is another's gain. There may be regret in business circles generally that steel is not so barometric as it used to be, when all trade eyes were turned on it, watching for signs that general business was going to get better or get worse.

The unfortunate feature of the old order of things was that the steel trade had to take all the chances. If business was in a good period, steel got its jolts before anyone else suffered, and made a warning outcry. If business was in a bad spell and was going to grow good, the steel mills got filled with low-priced business before they had information through other trade indexes that better and more profitable times were coming. There may have been some glory and prestige in the position, but neither cancellations and postponements when trade seemed to be active nor low-priced sales when better prices were going to rule were at all pleasing.

To some observers it might seem that the steel trade knows less about its future now than it used to know, when it is recalled how the steel mills were often reported to be "filled" for this or that period of months—many months. Of late the steel mills have not been "filled" even for weeks. But the steel producers know that it was their contract books, not their mills, that were filled. Cancellations, postponements and failure to specify could come at any time, and often appeared to come out of a clear sky.

Nowadays the buying, making and shipping of steel is in close step with consumption, with the actual building and manufacturing operations of the country. Steel conditions do not grow bad when trade in general keeps marching merrily along. Rather, if anything, it is getting to be the other way about—that the steel trade at times can foresee changes in some lines of trade before it experiences any change of consequence in its own affairs.

It might be said that nowadays steel sales and steel shipments depend upon what men are doing, while in the old days they depended upon what men were thinking. Thoughts may change overnight, but actual work involving the consumption of steel does not change so suddenly. When it was a matter of how men thought there was much talk of "confidence." In good times the hope was that nothing would occur to "disturb confidence" and in poor times that something would occur to "restore confidence." Now it is more a matter of actions, of work, and we have quantitative economics.

At the present moment we have a good illustration of the difference. There has been a turn in steel, for of course no one could fancy that fluctuations would disappear; but in the old order of things any turn at all had to be a violent one, while this turn is very gentle.

Thus on the whole it may be argued that the steel market is on safer ground than it used to occupy, despite the superficial showing it used to make sometimes of being in safe position for a long run. Of course, the mills had to learn not to act in periods of lessened demand as they used to act, letting prices down for the sake of the rebound, and they have had some encouragement from buyers, who realize nowadays the advantages of steadiness in trade.

Pre-War and Present Metal Prices

COMPARISONS of present prices of pig iron, steel and non-ferrous metals with those of pre-war years show great divergences. At this late date we do not consider such variations as failure to readjust or reconstitute, but as the result of natural influences. Today's prices compare with ten-year pre-war averages as follows:

	Per Cent
Pig iron	+29
Finished steel	+43
Tin	+70
Copper	—11
Lead	+66
Zinc	+21

For the pig iron and finished steel comparisons THE IRON AGE composites are used. For tin and

copper the New York prices are used, while lead and zinc are at St. Louis.

The smaller advance in pig iron than in steel may not be easily explained in full, but one factor undoubtedly is that demand has not increased so greatly in pig iron, the proportion of foundry iron to steel-making iron not having held up.

The large advance in tin, which is a foreign product not influenced by conditions in the United States except for the great increase in our consumption, is due to supplies having been relatively limited, while they are under close control. It is no secret that there are large profits in the production of tin.

Our domestic metals, copper, lead and zinc, illustrate very clearly the working of natural laws. In copper there have been remarkable improvements in manufacture, greatly reducing the cost, or more accurately speaking greatly widening the range of ores that can be treated profitably. In lead and zinc there have been improvements, but nothing at all comparable with what has occurred in copper. The ore supplies are relatively limited, and there is more or less relationship between the offerings of material and the consumptive demand. There is more strenuous competition in zinc than in lead. The larger advance in lead is not due to a proportionately greater increase in demand, for last year's production of lead was 58 per cent above the 1913 production, while zinc showed a 64 per cent increase.

The Bureau of Labor's index for all commodity prices at wholesale stood at 151.1 at the latest report, for April. This is based on 1913 prices. Related to the ten-year pre-war average the April commodity prices represented an advance of 62 per cent. Thus, by comparison with the ten-year period, pig iron and steel are relatively low, and so is zinc, while copper is very low indeed, at 89 for copper and 162 for commodities as a whole. Only lead and tin show greater advances than commodities in general.

Canada's Vexing Tariff

PROTESTS by Canada's steel manufacturers against the various reductions made at Ottawa in the metal schedules of the Dominion tariff have been repeated but ineffective. Importations of iron and steel continue to grow. Just now that section of Canadian industry represented by makers of materials and parts for automobiles is up in arms over the recent action of the Government at Ottawa in lowering the duty on automobiles brought into Canada. The Government is urged to reconsider its action, lest the benefits to the public in the form of cheaper automobiles be more than offset by the losses in wages which have been paid to Canadian workmen. Tariff reductions have been made on complete bodies, tops, chassis and wheels, and the budget reduces by 25 per cent the duties on all articles imported for making automobiles and motor trucks provided 50 per cent of the factory cost of such automobiles and motor trucks is Canadian.

Canadian automobile plants, which are mainly branches of American companies, cannot compete with the mass production methods of the larger factories on this side of the line. The Canadian plants, it is announced, will be shut down and cars will be exported to Canada from plants in this country if the reduction in the tariff remains.

The Canadian Manufacturers' Association, through its publication *Industrial Canada* and otherwise, has appealed to the Canadian Government to reconsider its action "before it is too late."

Among plants which it has been said will be closed if the new tariff stands is that of Dodge Brothers, Ltd., recently built at a cost of $3,000,000 and which employs about 450 men, and those of the General Motors Corporation (3700 employees) and of the Willys-Overland and Durant companies, each of which employs several hundred men.

Crude Editing of Company Papers

A PUBLICATION which is distributed among employees of an industrial plant may be made a valuable influence in the relations of workers with each other and of employees and management. But this is not always the case. Instead, such a paper may become an insidious disturber, as has been demonstrated recently in a plant employing some 3000 men and women who average more than ordinarily high in intelligence and in skill as artisans. The editor-in-chief and his assistants were tactless in handling news of the doings of employees, and the management, giving the matter little or no thought, was ignorant of what was going on.

Personal weaknesses of individuals were touched upon in facetious vein. Incipient romances were laid bare to the public gaze. Cartoons emphasized unfortunate physical peculiarities. Jokes proved to be no jokes at all. One such paragraph, having no basis in fact, nearly caused the breaking up of a family. Instead of complaining the victims nursed their hurts. The situation was slow in coming to the attention of the management. Investigation showed that men and women were dreading the appearance of each succeeding issue for fear their turns would come. It is believed that more than one person sought other employment for no other reason. The editorial staff was given a violent shake-up. Those high in authority are now reading proofs.

The factory newspaper has a distinct purpose. It is intended to promote morale by engendering the "one big family" feeling, in other words esprit de corps. Many such publications aim to educate workers along the lines of their employment. But they must be watched. They are apt to "peter out" as time goes on, which is one reason why so many of them die when times get dull. Owners feel they are money thrown away.

However, a really good company paper is highly appreciated by employees. They seem to want the personal news, announcements of activities, social and athletic, and presumably useful articles which give them a better understanding of the business. Photographs and friendly cartoons are appreciated. Any large plant has plenty of such news material. A mistake of some editors of this class of journal is in their attempt to "get down to the level" of the workers, as they put it. Usually the result of such an effort is to get so far below that level as to

repel the reader. Personalities which could possibly leave a sting should never be indulged.

WHEN the medical doctor is called, on what proves to be a false alarm, the obligation is generally recognized, though physicians would probably concur that bills for such visits are not always cheerfully or promptly paid. When it comes to demanding service for an alleged breakdown of a machine, the ethical relation of user and maker does not seem correspondingly well defined. Put the question before a group of machinery makers and the immediate rejoinder in concert is that the demand must be countered by protective stipulations. The experienced respond to the S. O. S. by asking compensation, including expenses, if the fault is found to be outside the condemned equipment. So commonly does the call prove unwarranted, that it is no wonder that sellers advise talking terms before the industrial doctor is called.

CONSERVATION of natural resources — a familiar slogan of two decades ago—appears in the steadily growing use of water power to produce electricity. Figures of the United States Geological Survey show that the amount of public utility electric power generated by water wheels increased from 14.6 billions of kilowatt-hours in 1919 to 22.35 billions in 1925. This was a 53 per cent gain. However, the increase in the electric output generated by fuel was no less than 79 per cent, the amount having gone up from 24.3 billions in 1919 to 43.5 billions in 1925. As a result, the proportion generated by water power declined from more than 37 per cent of the total in 1919 and 1920 to less than 34 per cent in 1924 and 1925. Unless, therefore, more use is made of our abundant idle supply of water power, through harnessing it for producing electric current in large quantities, the conservation of our fuel resources cannot keep pace with our future needs for power.

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42 Companies Earned 5.9 Per Cent

Low Return to Steel Manufacturers in 1925, Yet Better Than for 1924—Companies Had 87 Per Cent of Country's Capacity

THE iron and steel industry in 1925 showed a return of 5.9 per cent on investment, according to a composite statement recently compiled showing the results obtained by 42 companies. It would appear from the compilation that on the whole the industry fared better last year than in 1924. But when it is considered that the finished steel output last year represented 44,140,738 gross tons of ingots, and that this was a record ingot production, the return is unsatisfactory.

The statement shows stockholders' investment in the 42 companies for last year, with percentage of return on investment and yearly ingot capacity, the companies listed representing 87 per cent of the estimated theoretical ingot capacity of 56,000,000 tons, the figure adopted by the American Iron and Steel Institute.

The total investment of the 42 companies is placed at $3,320,722,046, net earnings last year being $195,868,225. The accumulated surplus of the 42 companies was $1,151,260,394. Two of the companies showed a deficit last year.

In THE IRON AGE of May 14, 1925, page 1424, a similar analysis was made of the 1924 earnings of 20 companies. The average return on stockholders' investment was shown to be 4.8 per cent. For all companies outside the Steel Corporation the average was 3.98 per cent.

EASY HANDLING OF SCRAP

Design of Open-Hearth Stockyards to Avoid Needless Vertical Movements of Magnets

DURING a visit to steel works in the Middle West a representative of THE IRON AGE saw in two such plants a simple and effective means of easing the problem of handling steel scrap. The arrangement in both cases was practically the same. The two plants were the Wisconsin Steel Co., at South Chicago, and the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio.

Both plants have open-hearth stockyards under cover. Both have a considerable portion of the width of the yard devoted to the emergency storage of scrap. The remaining portion of the width is occupied by running tracks for railroad cars bringing in scrap and charging buggies for the furnaces. In each case the incoming running track carrying scrap and other materials is depressed about 4 ft. below the level of the track for charging buggies. As a result, the top of the gondola or other cars carrying scrap is about on a level with the charging pans. Inasmuch as four-fifths of the scrap loaded into these pans is loaded directly from cars, the advantage of this arrangement is evident. An incidental advantage lies in easing the grades from the railroad level.

In the Wisconsin plant the scrap storage, with a capacity of some 20,000 tons, has its floor about 20 ft. below the level on which the charging cars are operated. This provides a heavy accommodation for storage, without making it necessary for the crane to operate its magnet at the high levels on top of a pile resting upon the upper level. This storage, of course, represents merely a reservoir out of which scrap is taken for the furnaces when there is delay in getting cars of scrap into the yard and into which scrap again is taken from cars when the supply exceeds the furnace demands. As the upper layer of this scrap pile has the greatest activity, the fact that using the bottom of the pile would necessitate considerable hoisting of the magnet to reach loading pans becomes a matter of secondary importance.

Latrobe Electric Steel Co., Latrobe, Pa., now has in operation its new 10-in. motor-driven two-speed mill and its 9-in. mill, which also is equipped with a constant-speed motor and two-speed drives. The drive gears were furnished by the Farrel Foundry & Machine Co., Ansonia, Conn., the motor for the 10-in. mill by the General Electric Co., and that for the 9-in. mill by the Westinghouse Electric & Mfg. Co. W. H. Cogswell, Oliver Building, Pittsburgh, was consulting engineer.

C. M. Schwab Discusses Profits

Lays Inadequate Earnings Largely Against Poor Management, In Address Before Sheet Steel Executives—Two Days of the Meeting

WHITE SULPHUR SPRINGS, W. VA., May 18.—With all except two or three of the independent sheet steel manufacturers of the Eastern half of the country represented, the fourth annual meeting of the sheet steel executives opened here last night at the Hotel Greenbrier, with a fellowship dinner, one of the pleasant surprises of which was the presence of Charles M. Schwab, chairman Bethlehem Steel Corporation, who is staying here. He made a brief address in which he emphasized the low rate of return the steel industry as a whole was getting on the investment in the business. This he said was due more to poor management than to any other cause.

He reviewed briefly his connection of almost fifty years with the industry and recounted many of the changes that had taken place since his entry in 1878, when the country was producing annually only as much steel as his own company alone now produces in a month.

Weakness Among Captains of Industry

But earnings on the investment were in inverse ratio to the expansion in production, he added, stating that since his retirement from the presidency of the United States Steel Corporation in 1903 to date the corporation has spent two billion dollars on plant and was not today earning any more on its investment than it did 23 years ago. He said that if he controlled the entire steel industry of the United States and that if the management could show no better returns on the capital invested than 4 per cent, as is at present the case, he would change the management. "In spending money for plant improvements and enlargements not enough thought," he said, "was given to what the expenditure would earn and, in view of the fact that the industry was steadily exhausting its unreplaceable raw materials, it was virtually giving them away in not getting a fair return on the investment."

Mr. Schwab also attended the first business session of the meeting this morning, at which G. H. Charls, president United Alloy Steel Corporation, Canton, Ohio, presided, and he concluded the session with another talk in which he amplified what he said last night. He said he believed that the weak part of the steel industry was not in the manufacturing division, which had gone right on steadily in making steel and reducing the costs, nor in the distribution, but in the general management, in which he included chairmen, presidents and those generally referred to as captains of the industry. If the present captains could do no better than a return of less than 4 per cent on the investment it was time to begin promotions from the ranks. No industry was doing so poorly from the standpoint of investment return as the steel industry and the answer, he said, was to be found among those who are responsible for individual company policies.

Special Prices Not Long Private

Mr. Schwab urged the study of statistics of the industry. There was no great variation in the total business of a company, whether it maintained or cut its prices. Buyers are willing to pay a fair price for steel and manufacturers should have a fair profit. Buyers, however, do demand equal treatment as to prices, because engaged in competitive business. He illustrated this statement by drawing attention to the price of standard rails, which changes only rarely, and yet there was no attempt on the part of the railroads to get lower prices and it was chiefly because all railroads got the same price.

The remedy for price irregularities in other products, he continued, was to be found in a better understanding among manufacturers and the steel makers should get away from the idea that others do not know of special prices privately made. There is no longer much difference in steel producing costs among the manufacturers. A governing factor in business is location of plant in relation to consuming point and the companies all would get a definite amount of business regardless of the price, he insisted, mentioning the Steel Corporation specifically as likely to get a share of business in proportion to its productive capacity.

Mr. Schwab said he still was optimistic in his ideas of what the country would ultimately produce and predicted that one day the output would reach 100,000,000 tons annually. The United States, with only 6 per cent of the world's population, was producing 50 per cent of all the manufactures and with the resources we had, to say nothing of the energy of the people, we would keep right on growing.

"The Romance of Business" was the subject of Thomas D. McCloskey, general counsel National Association of Sheet and Tin Plate Manufacturers, who traced the rise of the late E. H. Harriman in the railroad field, of John D. Rockefeller in the oil industry and then the development of the steel industry and the creation of the Steel Corporation. The speaker said, however, that the greatest romance of business remained to be written and that was the story of the solution of the strife between capital and labor and that story, like all romances, would begin in strife and end in love.

W. S. Horner, president National Association of Sheet and Tin Plate Manufacturers, was the next speaker, his subject being "The Sheet Steel Industry —How Can Reasonable Market Stability be Effected?" He spoke on the need for and development of reliable trade information and the advantages to be derived from trade extension efforts, all leading to price stability and better market conditions. His address is reviewed elsewhere in this issue.

Too Much Duplication of Plant

"Wastefulness and Extravagance of Duplication in Industry" was the topic of Severn P. Ker, president Sharon Steel Hoop Co., Sharon, Pa., and in it he made out a strong case against the necessity of additional new capacity, claiming that while he did not believe that the steel industry had anywhere nearly reached the goal of ultimate production, the modernization of existing plants, although based on the idea of increased efficiency, had actually resulted in an increase in production. The construction of unnecessary plants therefore would inevitably lead to a decrease in the value of the products. The lack of adequate return on the capital investment, on the steel industry, he said, was disgraceful and the keeping of new capacity within reasonable limits would tend to help the financial situation and best serve the state and the stockholders. He expressed the belief that the present day costs of new construction would probably act as a check, but he expected that the finding of an outlet for finished material would probably mean extension and improvements of present facilities in the effort to attain efficiency.

Discusses Steel Plant Labor Problem

There were many things of interest to the manufacturers of sheet steel in a talk by Charles R. Hook, vice-president American Rolling Mill Co., Middletown, Ohio, who spoke on, "Some Labor Problems Confront-

(*Concluded on Page* 1465)

Iron and Steel Markets

Slight Changes in Mill Schedules

May Operations Somewhat Under 80 Per Cent—Bar Sales at 1.90c. More Common—Greater Competition in Sheets

MODERATE increase in the rate of new orders in May, as compared with the first half of April, is still the best feature of the steel situation. Evening up for the large scale production of the past four months has brought some further reduction in mill operations, and meanwhile there are price concessions in several products, including bars and sheets.

At 90 per cent this week for the Steel Corporation, 80 per cent for Bethlehem, and an average for all producers somewhat under 80, the industry promises to run through May at close to the present rate. June will bring some further curtailment, but it is not likely to be pronounced.

Several steel company blast furnaces, including two of the Steel Corporation in the Pittsburgh district, are blowing out in view of the reduced rate of ingot production.

The Chesapeake & Ohio distribution of 30,000 tons of rails for second half delivery and the inquiry of the Southern Pacific for 23,000 tons are indications of more activity in railroad buying. The C. & O. divided about 24,000 tons of its order between the Inland and Illinois Steel Co. mills, while 6400 tons will be rolled at Sparrows Point. The recent order of the Southern Railway was for 48,600 tons, Bethlehem receiving 5000 tons, the Ensley, Ala., mill about 42,000 tons, and the Illinois Steel Co. 2000 tons. Track fastenings for the two orders amount to 14,000 tons. There are small rail inquiries from the Wabash and the Detroit & Toledo Shore Line.

An early inquiry is expected from the Rock Island for rails and track supplies for a 150-mile extension in the Southwest.

Chicago district plate mills welcome an increase in oil tank work in the absence of railroad car buying. Their tank plate orders of the week totaled 18,000, and 25,000 tons more is under inquiry.

Western car works are bidding on 1200 freight car underframes for the Fruit Growers Express, the Central Railroad of New Jersey has reinstated an inquiry for 1000 box cars, and a Texas road has bought 300 cars.

Buying of automobile steel shows varying conditions. One Detroit builder will increase production in June, but in most cases there is curtailment, stocks of cars being large. In consequence, operating schedules of sheet and cold rolled strip mills are further restricted.

The outstanding development of the week in prices was the increasing proportion of sales of bars at 1.90c., Pittsburgh. While the largest transactions have carried this price for some time, the concession has now become more general on good sized lots and desirable specifications.

The largest sale of reinforcing bars reported at 1.90c., Pittsburgh, is 1900 tons for a manufacturing building in Philadelphia.

Included in the week's 26,000 tons of fabricated steel work was 7300 tons for tanks and agitators for a petroleum corporation. Bids have been taken on a bridge at Bath, Me., which will take 8000 tons. At Cleveland steel construction has been resumed after an 11 weeks' strike and much work is again under way.

Fabricated structural steel sales in April, amounting to 216,500 tons, were the largest so far this year. The four months' bookings totaled 790,000 tons against 793,000 tons for the same period last year.

Production and shipments of the independent makers of sheets were in substantial balance for the first four months of the year and stand at the very large total of 1,240,000 tons. Sales for this period called for nearly 990,000 tons, but the inroads on unfilled tonnage were not so great, seeing it amounted on May 1 to some 45 to 50 days' operations against about 65 days on Dec. 30.

Tonnage rates of sheet and tin mill workers have been advanced slightly for May and June under the union scale, the black sheet price used as the basis averaging 3.25c. in March and April against 3.20c. for the 60 days preceding.

Competition has sharpened in the Central Western pig iron market, as Lake and Valley furnaces have pushed for business in southern Ohio and other districts. An eastern Pennsylvania plate manufacturer has bought 10,000 tons of basic pig iron for delivery in the next 30 days at $21.75, delivered.

Scrap has declined further, several important grades, including melting steel, cast and railroad wrought being 50c. a ton lower.

Reports from Europe give further details of the European Rail Makers' Association. Quotas are given as follows: Belgium and Luxemburg, 17 per cent; France and Germany, 39.7; Great Britain, unofficially including United States, 43.25. Prices are £5 17s. 6d. to European consumers and £6 to others.

Competition for export business resulted in an American bid of 1.90c., c.i.f., Hamilton, Ont., on 5000 tons of plates, against a German bid of 1.93c.; also one between 1.55c. and 1.60c., c.i.f., Maracaibo, Venezuela, on reinforcing concrete bars, for prompt delivery. Belgium, it is believed, will supply 3320 tons of reinforcing bars and 300 tons of beams for a sea wall and driveway at Havana, Cuba.

THE IRON AGE composite pig iron price remains at $20.29 for a second week. This is the lowest figure since last October and $1.25 under the price on Jan. 1.

Finished steel is lower, due to yielding in bars. The new composite, 2.403c. per lb., compared with 2.417c. last week, is also the lowest since October, representing a decline of just $1 a ton since Jan. 1.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 18, 1926	May 11, 1926	Apr. 20, 1926	May 19, 1925
No. 2X, Philadelphia‡	$22.76	$22.76	$23.26	$21.26
No. 2, Valley Furnace†	19.00	19.00	19.00	19.00
No. 2, Southern, Cin'ti†	25.69	25.69	25.69	24.05
No. 2, Birmingham†	22.00	22.00	22.00	20.00
No. 2 foundry, Chicago*	21.50	21.50	22.00	21.00
Basic, del'd, eastern Pa.	21.75	21.75	21.75	21.00
Basic, Valley furnace	18.50	18.50	18.50	18.50
Valley Bessemer del. P'gh	21.26	21.26	21.26	21.26
Malleable, Chicago*	21.50	21.50	22.00	21.00
Malleable, Valley	19.00	19.00	19.00	19.00
Gray forge, Pittsburgh	20.26	20.26	20.26	20.26
L. S. charcoal, Chicago	29.04	29.04	29.04	29.04
Ferromanganese, furnace	88.00	88.00	88.00	115.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	39.20
Bess. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. sheet bars, P'gh	36.00	36.00	36.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	40.50
O.-h. billets, Phila.	40.30	40.30	40.30	40.67
Wire rods, Pittsburgh	45.00	45.00	45.00	46.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.90	1.90	1.90	2.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.22	2.22	2.22	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.05
Steel bars, Pittsburgh	*1.90*	2.00	2.00	2.00
Steel bars, Chicago	2.10	2.10	2.10	2.10
Steel bars, New York	*2.24*	2.34	2.34	2.34
Tank plates, Pittsburgh	1.85	1.85	1.90	2.00
Tank plates, Chicago	2.10	2.10	2.10	2.20
Tank plates, New York	2.24	2.24	2.24	2.24
Beams, Pittsburgh	1.90	1.90	1.90	2.00
Beams, Chicago	2.10	2.10	2.10	2.20
Beams, New York	2.24	2.24	2.24	2.34
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.40

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	May 18, 1926	May 11, 1926	Apr. 20, 1926	May 19, 1925
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.25	3.20
Sheets, black, No. 28, Chicago dist. mill	3.35	3.35	3.45	3.40
Sheets, galv., No. 28, P'gh	4.40	4.40	4.50	4.30
Sheets, galv., No. 28 Chicago dist. mill	4.60	4.60	4.70	4.50
Sheets, blue, 9 & 10, P'gh.	2.40	2.40	2.40	2.40
Sheets, blue, 9 & 10, Chicago dist. mill	2.60	2.60	2.60	2.50
Wire nails, Pittsburgh	2.65	2.65	2.65	2.75
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.85
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.60
Barbed wire galv., P'gh	3.35	3.35	3.35	3.45
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.55
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$15.00*	$15.50	$16.50	$16.00
Carwheels, Philadelphia	*17.00*	17.50	17.50	17.00
Heavy steel scrap, P'gh	*15.50*	15.75	16.50	17.00
Heavy steel scrap, Phila.	*15.00*	15.50	16.00	14.50
Heavy steel scrap, Ch'go	*12.00*	12.25	13.00	15.00
No. 1 cast, Pittsburgh	16.50	16.50	16.50	17.50
No. 1 cast, Philadelphia	*17.00*	17.50	17.50	17.00
No. 1 cast, Ch'go (net ton)	*15.75*	16.00	16.25	17.00
No. 1 RR. wrot, Phila.	*17.00*	17.50	17.50	17.50
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	12.25	13.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.90	$2.90	$3.00	$3.00
Foundry coke, prompt	4.00	4.00	4.00	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.00	14.00	14.12½	13.62½
Electrolytic copper, refinery	13.62½	13.62½	13.75	13.37½
Zinc, St. Louis	**6.85**	6.75	6.95	6.90
Zinc, New York	**7.20**	7.10	7.30	7.25
Lead, St. Louis	*7.50*	7.55	7.50	7.85
Lead, New York	7.75	7.75	7.85	8.15
Tin (Straits), New York	*62.00*	64.50	62.50	54.25
Antimony (Asiatic), N. Y.	*12.00*	12.75	17.50	17.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Bars Down to 1.90c. and Scrap Is Lower, But Other Prices Are Steady

PITTSBURGH, May 18.—Conditions in the iron and steel industry in this district remain virtually unchanged from those that existed a week ago. While on the whole there is a fairly close balance between production and shipments, which is particularly true of such lines as pipe, sheets and tin plate, there is a tendency toward a further recession in the output of some products, including the heavier forms, such as plates, shapes and steel bars. This is due to hand-to-mouth buying and to the fact that mills have drawn rather heavily on bookings. Operations for the industry in this district range from 65 to 75 per cent of capacity. There is some piling of pig iron at merchant blast furnaces, and indications are that one or two now in blast in the Valley will be either banked or blown out in the near future.

The trade regards the market as fairly well stabilized and likely to remain so for the next 60 days, without any marked change one way or the other in business. Prices of some grades of scrap have softened during the past week, but in most other lines are unchanged and in some instances appear to be steadier. In the Mahoning Valley the Trumbull Steel Co. has added two open-hearth furnaces to its active list, while the Carnegie Steel Co. has taken off one blast furnace at its Ohio works, leaving five active and one idle.

The market for pig iron continues to be extremely dull, and buying is confined to small quantities ranging from carloads to 200 and 300 tons. Melters, for the most part, still have on hand tonnages bought during the first quarter, or if not, they are closing for immediate requirements only, because of the small orders they, in turn, have on their own books.

While makers of plates and shapes continue to quote 1.90c., base, Pittsburgh, it is evident that at least so far as plates are concerned, 1.85c. can be done on moderate tonnages. On soft steel bars 2c., Pittsburgh, is still quoted for small lots, but 1.90c. is becoming an increasingly common price. The coke market is dragging, and furnaces are buying cautiously and in small lots. Prompt furnace coke remains at $2.90, Connellsville ovens, and prompt foundry coke at $4.

Pig Iron.—The dullness in the pig iron market leaves prices untested. Meanwhile quotations are unchanged, with No. 2 foundry at $19, Valley, basic at $18.50, Valley, and Bessemer at $19.50, Valley. Low phosphorus, copper free, is quoted by one producer at $27.50 to $28.50, furnace, although this grade of iron is being shipped to this section from eastern Pennsylvania at prices of $3 to $4 under these quotations. Two lots of Bessemer iron, one of 200 tons and another of 300 tons, have just been sold by a Valley furnace at the regular price of $19.50, Valley. Consumers of pig iron are showing but little interest in the mar-

ket, being aware that they can get immediate shipment and that production exceeds output. It is evident that buying for the first quarter was on a sufficiently large scale to leave stocks on hands, which are being drawn upon by many users. Others without stocks are, for the most part, taking only carloads of both steel-making and foundry grades to cover immediate requirements. This situation at least gives some promise of better buying for third quarter delivery. One Valley merchant furnace is about to bank or blow out, and it is likely that another also will be shut down within a short time. The Carnegie Steel Co. during the past week has taken off one blast furnace at its Ohio works in Youngstown, making five active and one idle.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$18.50
Bessemer	19.50
Gray forge	18.50
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	$19.00 to 19.50
Low phosphorus, copper free	27.50

Coke.—The listlessness in the market for coke indicates that operations in the Connellsville district will be further curtailed. Merchant blast furnaces are buying for immediate needs only, and the small demand leaves the price of $2.90, Connellsville, for 48-hr. fuel rather easy. It is understood that a small amount of this grade of coke has moved at $2.85. Foundry coke is in such light demand that the price has not been given a good test and meanwhile continues to be quoted at $4, ovens. No change has developed in the market for coal which continues to lag.

Ferroalloys.—Consumers of spiegeleisen generally have protected themselves against their requirements for the last half at the same prices as for the first six months of the year, or around $32 per gross ton, furnace, for average 20 per cent material. Users are well covered by contracts for the remainder of the year on ferromanganese, and business consists almost entirely of specifications. These are reported to be good, despite some dropping off in steel works operations. In high grade ferrosilicon also specifications constitute the bulk of the business. Prices are given on page 1453.

Semi-Finished Steel.—There is almost no buying, and specifications reflect the rather light operations of strip and sheet mills, as well as the fact that most of the steel companies which buy instead of make their steel began the present quarter with fairly large stocks of billets, slabs and sheet bars. Not a few of the non-integrated manufacturers are buying steel on monthly, instead of quarterly, contracts. Their purpose, of course, has been to be in a position to take advantage of a decline in prices if one came, but all business reported in this quarter has carried the first quarter prices of $35, Pittsburgh or Youngstown, for large billets and slabs, and $36, for sheet bars and small billets and slabs. Forging quality steel still is quoted at $40, base. Wire rods are slow, but the desire for business is not so strong as to induce price concessions. Prices are given on page 1453.

Cold-Finished Steel Bars and Shafting.—The past week has seen some falling off in business, due chiefly to the fact that the automobile parts makers are finding their requirements smaller, as motor car builders are getting ready for the new models they will begin to put on the market around July 1. Buying is confined to actual needs, and this means small individual orders and a good deal of pressure for shipments, since, as has been the case for some time, few consumers of steel serving the automotive industry have been disposed to carry more than a few weeks' stock. There continues to be close observance of 2.50c., base, Pittsburgh, on the every day tonnages.

Wire Products.—Conditions in the market are somewhat better, but demand is only moderate, due largely to the backward season. Makers report prices firm at $2.50, base, per 100 lb., Pittsburgh, for bright hard wire. Operations range from 50 to 60 per cent of capacity. Nails continue to be quoted $2.65, base, per keg, Pittsburgh. Prices are given on page 1451.

Rails and Track Supplies.—Light rails appear to be firm at $34. Demand is rather light, and orders for billet rails are small, owing to the limited operations of coal mines. Business in standard-section rails is dull, and the market for standard spikes is quiet. Prices are given on page 1451.

Tubular Goods.—Considerable improvement continues to be reflected in the demand for practically all grades of pipe. Both merchant and oil well goods are being booked in good-sized quantities, and operations are being maintained at a high rate. There also has been improvement in the secondary market. Moderate demand exists for boiler tubes, and fairly good-sized bookings are being made.

Sheets.—Makers of sheets report that business has improved during the past week and that orders are well distributed. Stocks are rather low, and it is expected that the better demand will continue. Demand from the automotive industry, however, is comparatively light, although some automobile manufacturers are specifying for good-sized tonnages and also are increasing requirements. Mill operations are at the rate of about 70 per cent of capacity. Black sheets are quoted at 3.25c. to 3.35c., base, Pittsburgh, but some tonnage is understood to have been taken at 3.15c. to 3.20c., base, Pittsburgh. Galvanized sheets are quoted at 4.50c. to 4.60c., base, Pittsburgh. It is reported, however, that the price of 4.40c., base, on fair-sized tonnages has not disappeared. Prices are given on page 1451.

Tin Plate.—Dependent upon favorable crops, indications are that good business is ahead in tin plate for another year. The present backward season, however, has limited new business, but operations are being maintained at approximately 90 per cent of capac-

THE IRON AGE Composite Prices

Finished Steel

May 18, 1926, 2.403c. Per Lb.

One week ago	2.417c.
One month ago	2.439c.
One year ago	2.460c.
10-year pre-war average	1.689c.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

	High		Low	
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	April 24;	2.446c.,	Jan. 2

Pig Iron

May 18, 1926, $20.29 Per Gross Ton

One week ago	$20.29
One month ago	20.46
One year ago	19.63
10-year pre-war average	15.72

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

	High		Low	
1926	$21.54,	Jan. 5;	$20.29,	May 11
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.10c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.24c. to 2.34c.
Del'd Cleveland	2.19c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.

Rail Steel

F.o.b. mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	3.00c.
Common iron, del'd Philadelphia	2.22c.
Common iron, del'd New York	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.00c. to 2.15c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
C.i.f. Pacific ports	2.25c. to 2.30c

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.10c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.12c. to 2.22c.
Del'd New York	2.14c. to 2.24c.
C.i.f. Pacific ports	2.30c. to 2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.50c.
All gages, 6 in. and wider, P'gh	2.30c.
All gages, 6 in. and narrower, Chicago	2.60c.
All gages, wider than 6 in., Chicago	2.50c.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.50c.
Bars, f.o.b. Chicago	2.50c.
Bars, Cleveland	2.55c.
Shafting, ground, f.o.b. mill	*2.70c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	3.75c.
Strips, f.o.b. Cleveland mills	3.75c.
Strips, delivered Chicago	4.05c.
Strips, f.o.b. Worcester mills	4.05c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galv'd nails, 1-in. and longer	4.65
Galv'd nails, shorter than 1 in	4.90
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.35c. to 2.40c.
Nos. 9 and 10, f.o.b. Ch'go dist. mills	2.60c.
Nos. 9 and 10, del'd Philadelphia	2.72c.

Box Annealed, One Pass Cold Rolled

No. 28, f.o.b. Pittsburgh	3.05c. to 3.25c.
No. 28, f.o.b. Ch'go dist. mill	3.35c. to 3.45c.
No. 28, del'd Philadelphia	3.47c. to 3.57c.

Galvanized

No. 28, f.o.b. Pittsburgh	4.40c. to 4.50c.
No. 28, f.o.b. Chicago dist. mills	4.60c. to 4.70c.
No. 28, del'd Philadelphia	4.72c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.15c. to 3.25c.
No. 28, f.o.b. Chicago dist. mill	3.45c.

Automobile Body Sheets

No. 22, f.o.b. Pittsburgh	4.30c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.85c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40
8-lb. coating I.C.	11.70
15-lb. coating I.C	14.85
20-lb. coating I.C.	$16.20
25-lb. coating I.C.	17.90
30-lb. coating I.C.	19.45
40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers		Base Per 100 Lb.
2100*	(1½% Nickel, 0.10% to 0.20% Carbon)	$3.20 to $3.25
2300	(3½% Nickel)	4.50
2500	(5% Nickel)	5.70 to 5.80
3100	(Nickel Chromium)	3.50
3200	(Nickel Chromium)	5.00 to 5.25
3300	(Nickel Chromium)	7.00 to 7.25
3400	(Nickel Chromium)	6.25 to 6.50
5100	(Chromium Steel)	3.40 to 3.50
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.30
6100	(Chrom. Vanad. spring steel)	3.80
9250	(Silicon Manganese spring steel)	3.20 to 3.25
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.40 to 3.50
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00
Light (from billets), f.o.b. Ch'go mill	36.00 to 38.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80 to $3.00
Spikes, ½ in. and smaller	2.85 to 3.25
Spikes, boat and barge	3.25
Track bolts, all sizes	4.00 to 4.50
Tie plates, steel	2.25 to 2.35
Angle bars	2.75

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	12
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41¼	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	7
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	34	3¼ and 3½ in.	50
2½ and 2¾ in.	42	4 in.	53
3 in.	48	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

ity. While exports of tin plate probably would have been increased measurably, had the strike in Great Britain continued, it is also true that the American manufacturer by reason of his high grade product has built up a fairly large market abroad, which is being consistently increased. This export demand is a factor in maintaining operations at a high rate.

Steel and Iron Bars.—A price change seems to be developing in steel bars, though they continue to be quoted at 2c. base, Pittsburgh. More large users however, appear to be getting a price of 1.90c. Demand is only fair, but rather steady. The market for iron bars is quiet, and prices are unchanged.

Structural Steel.—Bookings in structural shapes are not heavy, but are of a miscellaneous character. While on larger tonnages it is understood the market might be shaded slightly, the current quotation on business being taken is 1.90c., base, Pittsburgh. Inquiries are coming to fabricators in fair volume.

Plates.—Quotations on plates range from 1.85c. to 1.90c., base, Pittsburgh, with most makers naming the latter price. Business is so light, however, that the market has not been given a good test recently.

Hot-Rolled Flats.—Makers of hot-rolled flats are maintaining recently established prices, and demand is steady, but not large in volume. Buyers are coming into the market only as their immediate needs require.

Cold-Rolled Strips.—The check in orders from the automobile industry has affected the market for cold-rolled strip steel, but despite strong competition, the general price appears to be holding at 3.75c., base, Pittsburgh. It is believed that demand has reached bottom and that therefore improvement may develop in the near future.

Bolts, Nuts and Rivets.—New business coming to makers of bolts, nuts and rivets is light. Operations and prices have not changed during the past week, although recently there was a slight slackening in production. Prices are given on page 1453.

Warehouse Business.—Improved weather conditions have been reflected in a more favorable situation in warehouse business. Jobbers are buying somewhat more freely in general lines. Business, however, remains rather dull. Prices are unchanged.

Old Material.—Prices still tend down in this market, with only a moderate amount of interest in supplies on the part of melters and with dealers short of the market showing little eagerness to cover. On heavy melting steel the market now is quoted at $15.50 to $16, or $3.50 a ton below the top price of the early part of the year. Prices have shown a downward tendency without much interruption since the beginning of the year, and that this occurred in the face of the heaviest production of steel in the history of the industry is one of the mysteries of the scrap market. Steel companies are making pig iron at lower costs than ever before, but to get good steel there is a limit to the amount of pig iron that can be charged. Since they bought scrap sparingly, the notion is gaining ground that the heavy production of steel must also have meant the production of a good deal more of unmarketable grade than usual and that this has taken the place of purchased scrap.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$15.50 to $16.00
No. 1 cast, cupola size	16.50 to 17.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Low phosphorus blooms and billet ends	20.00 to 20.50
Low phosphorus plates and other material	18.50 to 19.00
Low phosphorus punchings	18.50 to 19.00
Steel car axles	21.00 to 21.50
Cast iron wheels	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Machine shop turnings	11.00 to 11.50
Short shoveling turnings	11.50 to 12.00
Sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	15.00 to 15.50
Short mixed borings and turnings	11.50 to 12.00
Heavy breakable cast	15.00 to 15.50
Cast iron borings	11.50 to 12.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	15.50 to 16.00
Malleable scrap	16.50 to 17.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Tank plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforced steel bars	2.90c.
Black sheets (No. 28 gage), 25 or more bundles	4.10c.
Galvanized sheets (No. 28 gage), 25 or more bundles	5.15c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.55c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Spikes, large	3.30c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Bolts, track	4.90c.
Wire, black soft annealed, base per 100 lb.	$3.00
Wire, galvanized soft, base per 100 lb.	3.00
Common wire nails, per keg	3.00
Cement coated nails	3.05

REINFORCING STEEL

More Than 7000 Tons Awarded, Including 1900 Tons for Philadelphia Project

Awards of reinforcing bars within the week totaled about 7000 tons, the largest being 1900 tons for buildings in Philadelphia for the General Electric Co. For a county hospital in Chicago 1200 tons of rail steel was bought. Awards follow:

NEW YORK, 200 tons, garage, R. H. Macy & Co., to Concrete Steel Co.

BROOKLYN, 580 tons, New York *Daily News* plant, to McClintic-Marshall Co.

PHILADELPHIA, 1900 tons, General Electric Co., manufacturing buildings, to Jones & Laughlin Steel Corporation through Turner Construction Co.

ROCHESTER, PA., 100 tons, Penn-Beaver Hotel, to Truscon Steel Co.

YOUNGSTOWN, 200 tons, garage, to Jones & Laughlin Steel Corporation.

CHICAGO, 1200 tons rail steel, addition to Cook County Hospital, to Calumet Steel Co..

CHICAGO, 160 tons rail steel, Chicago Latin School, 1500 North Dearborn Street, to Calumet Steel Co.

CHICAGO, 225 tons rail steel, building for Crane Co., to Calumet Steel Co.

CHICAGO, 400 tons, Astor Street apartment building, to Joseph T. Ryerson & Son.

CHICAGO, 110 tons rail steel, Lanski Apartment, 6300 North Sheridan Road, to Inland Steel Co.

CHICAGO, 650 tons rail steel, Wallen apartment building, Sheridan Road and Foster Street, to Inland Steel Co.

CHICAGO, 100 tons, Mutual National Bank Building, to Olney J. Dean & Co.

ABINGDON, ILL., 100 tons, Abingdon Sanitary Mfg. Co., to Olney J. Dean & Co.

GARY, IND., 150 tons, Tribe of K building, to Kalman Steel Co.

FORT DODGE, IOWA, 215 tons rail steel, office building, to Calumet Steel Co.

NEENAH, WIS., 215 tons, highway bridge, to Joseph T. Ryerson & Son

SACRAMENTO, CAL., 127 tons, three bridges for California Highway Commission, to unnamed bidder.

SAN FRANCISCO, 120 tons, American Radiator Co. warehouse, Second and Townsend Streets, to unnamed local jobber.

PORTLAND, ORE., 250 tons, six highway bridges for Oregon Highway Commission, to unnamed bidder.

SEATTLE, WASH., 220 tons, McDowell Building, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

COLUMBUS, OHIO, 350 tons, City Hall.

BLOOMINGTON, ILL., 600 tons, sewage disposal plant; general contractor, J. L. Simmons.

CHICAGO, 150 tons, Bradwell public school; general contractor, S. N. Nielson.

CHICAGO, 300 tons, addition to Y. M. C. A. building at Wabash and Congress Streets.

JEFFERSON CITY, MO., 1000 to 1500 tons, highway project for Missouri Highway Commission.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rolling, 4-in. and over	$35.00
Rolling, 2-in. and smaller	36.00
Forging, ordinary	40.00
Forging, guaranteed	45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$36.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$35.00
6 in. x 2 in. and smaller	36.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$45.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $46. Cleveland mill base, $45.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	9.50c. to 10c.
Iron ore, Swedish, average 66% iron	9.50c.
Manganese ore, washed, 51% manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c. to 44c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.50 to $12.00
	Per Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $23.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	55c. to 60c.

Coke

	Per Net Ton	
Furnace, f.o.b. Connellsville prompt	$2.90 to	$3.00
Foundry, f.o.b. Connellsville prompt	$4.00 to	4.50
Foundry, by-product, Ch'go ovens		9.75
Foundry, by-product, New England, del'd		12.50
Foundry, by-product, Newark or Jersey City, delivered	9.75 to	10.77
Foundry, Birmingham	5.00 to	5.50
Foundry, by-product, St. Louis or Granite City		10.00

Coal

	Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to	$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to	1.75
Mine run gas coal, f.o.b. Pa. mines	1.90 to	2.10
Steam slack, f.o.b. W. Pa. mines	1.30 to	1.40
Gas slack, f.o.b. W. Pa. mines	1.40 to	1.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.	$88.00 to $95.00
Foreign, 80%, Atlantic or Gulf port, duty paid	$88.00 to 110.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$32.00 to $34.00
Domestic, 16 to 19%	31.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00
75%	145.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$42.00	12%	$42.00
11%	42.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$33.00	12%	$37.00
11%	35.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$25.50	10%	$31.00
7%	26.50	11%	33.00
8%	27.50	12%	35.00
9%	29.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	$1.20
Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.25 to $4.00
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.50 to $18.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,	$17.25 to $17.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	High Duty	Moderate Duty
Pennsylvania	$40.00 to $43.00	$38.00 to $40.00
Maryland	48.00 to 50.00	43.00 to 45.00
New Jersey	55.00 to 75.00	
Ohio	40.00 to 43.00	38.00 to 40.00
Kentucky	40.00 to 43.00	38.00 to 40.00
Illinois	40.00 to 43.00	35.00 to 38.00
Missouri	40.00 to 43.00	35.00 to 38.00
Ground fire clay, per ton	6.50 to	7.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago	49.00
Birmingham	50.00
Silica clay, per ton	$8.00 to 9.00

Magnesite Brick

	Per Net Ton
Standard size, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00 to $48.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(Less-than-Carload Lots)

(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

	Per Cent Off List
Machine bolts, small, rolled threads	60 and 10
Machine bolts, all sizes, cut threads	50, 10 and 10
Carriage bolts, smaller and shorter, rolled threads	50, 10 and 10
Carriage bolts, cut threads, all sizes	50 and 10
Eagle carriage bolts	65 and 10
Lag bolts	60, 10 and 10
Plow bolts, Nos. 3 and 7 heads	50 and 10
(Extra of 20% for other style heads)	
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,	45, 10 and 5
Larger and longer sizes	45, 10 and 5
Bolt ends with hot-pressed nuts	50, 10 and 10
Bolt ends with cold-pressed nuts	45, 10 and 5
Hot-pressed nuts, blank and tapped, square,	4.00c. per lb. off list
Hot-pressed nuts, blank or tapped, hexagons,	4.40c. per lb. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. per lb. off list
Washers*	6.50c. to 6.25c. per lb. off list

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots. On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Semi-finished hexagon nuts:	
⅞ in. and smaller, U. S. S.	80, 10 and 5
⅞ in. and larger, U. S. S.	75, 10, and 5
Small sizes, S. A. E.	80, 10, 10 and 5
S. A. E., ⅜ in. and larger	75, 10, 10 and 5
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

(To jobbers and consumers in large quantities)

	Per 100 Net S.A.E.	Per 100 Net U.S.S.		Per 100 Net S.A.E.	Per 100 Net U.S.S.
¼-in.	$0.44	$0.44	⅝-in.	$2.35	$2.40
5/16-in.	0.515	0.515	⅞-in.	3.60	3.60
⅜-in.	0.62	0.66	1-in.	5.65	5.80
7/16-in.	0.79	0.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.05	1¼-in.	12.60	13.10
9/16-in.	1.38	1.42	1⅜-in.	18.35	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes.—Prices on application.

Large Rivets

	Base Per 100 Lb.
F.o.b. Pittsburgh	$2.50 to $2.60
F.o.b. Cleveland	2.70
F.o.b. Chicago	2.75

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Milled cap screws	80 and 10
Milled standard set screws, case hardened,	50 and 5
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U. S. S. thread,	80, 10 and10
Upset hex. cap screws, S.A.E. thread,	80, 10 and 10
Upset set screws	80, 10 and 5
Milled studs	70 and 5

Chicago

Mills Book Heavy Plate Tonnage for Tanks—Large Rail Orders

CHICAGO, May 18.—Two steel works blast furnaces were blown out during the week. An Inland stack is out for minor repairs, and will probably be back in service by the first of next month. A Wisconsin Steel Works furnace is out for relining. The Steel Corporation continues to blow 21 stacks, and the count for the Chicago district now stands 28 active stacks out of a total of 36, excluding merchant furnaces.

Specifications and new business in finished steel stand practically unaltered from the previous week. Building activity is showing a gradual decline, but oil tank tonnage and railroad bridge specifications are heavier. A feature of the market is the placing during the week of close to 80,000 tons of standard-section rails and 14,000 tons of rail fastenings. Of the rails, 26,000 tons will be rolled by Chicago mills. The Southern Pacific is in the market for 24,000 tons of rails, and an early inquiry is expected from the Rock Island for rails and track supplies for a 150-mile extension in the Southwest. Demand for soft steel bars shows a gain, which is attributable, in large part, to better business from manufacturers of tractors and concrete reinforcing bar dealers.

Pig Iron.—Northern iron is steady at $21.50, furnace, and users are still disinclined to commit themselves beyond the first of July. Some inquiry for third quarter iron has appeared, but this is looked upon by the trade as a move on the part of buyers to feel out the market. Almost invariably when a large tonnage is asked for over an extended delivery period, the negotiations are closed with the purchase of a much smaller tonnage for delivery through May and June. May shipments are running about equal to those of April, and furnaces are now beginning to increase their stocks. A Chicago territory melter is inquiring for 600 to 800 tons of Northern iron and the Allis-Chalmers Mfg. Co., Milwaukee, is in the market for 3000 tons of foundry and malleable iron. A Milwaukee user of low phosphorus iron has placed 250 tons at $30.70, delivered, and another Milwaukee melter will take a like tonnage. A carlot of 11 per cent Bessemer ferrosilicon was sold for $35, f.o.b. Jackson, or $39.79, delivered Chicago.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25	$21.50
Northern No. 1 foundry, sil. 2.25 to 2.75	22.00
Malleable, not over 2.25 sil.	21.50
High phosphorus	21.50
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	$27.01 to 28.01
Southern No. 2 (barge and rail)	26.18 to 27.18
Low phos., sil. 1 to 2 per cent, copper free	30.70 to 31.20
Silvery, sil. 8 per cent	32.29
Ferrosilicon, 14 to 16 per cent	45.79

Ferroalloys.—A sale of 250 tons of 19 to 21 per cent spiegeleisen is reported at $32, Hazzard, Pa., or $39.76, delivered Chicago. Several small-tonnage sales brought $33, f.o.b. Hazzard. Several carlot sales of ferromanganese have been made at $88, seaboard, or $95.76, delivered.

We quote 80 per cent ferromanganese, $95.56, delivered Chicago; 50 per cent ferrosilicon, $85, delivered; spiegeleisen, 18 to 22 per cent, $39.76 to $40.76, delivered Chicago.

Plates.—Local mills have booked close to 18,000 tons of plates during the week for oil tank construction. The largest single order was 7300 tons for tanks and agitators for the East Chicago refinery of the Roxana Petroleum Corporation. Contracts for the construction of this equipment were awarded to two Chicago district fabricators and the order for the steel was divided about equally between two local mills. A tankage order from the Panhandle district of Texas called for 5600 tons of plates and one from Eldorado, Ark., has added 500 tons to makers' books. Tankage material on inquiry now totals close to 25,000 tons, the bulk of it being for the Pacific Coast. The revival of interest in oil tank construction comes at a time when it is most helpful to Chicago mills, inasmuch as the railroads, which are large users of plates for car construction, are delaying the announcement of car-building programs. The only railroad inquiry of note this week is 1200 freight car underframes for the Fruit Growers Express. Deliveries from Chicago mills are running about six to eight weeks for universal mill plates and from four to five weeks for sheared plates. Local mill prices are steady at 2.10c., Chicago, and Eastern mills are quoting 1.90c., base Pittsburgh, with deliveries in from 10 days to two weeks.

The mill quotation on plates is 2.10c. per lb., base, Chicago.

Sheets.—Users are specifying more liberally, and mills have had less difficulty in arranging schedules for galvanized and black sheets. Current Chicago delivered quotations are 2.65c. for blue annealed, 3.40c. to 3.50c. for black, and 4.65c. to 4.75c. for galvanized sheets. The foremost independent is operating 23 out of 28 hot mills.

Chicago delivered prices from mill are 3.40c. to 3.50c. for No. 28 black; 2.65c. for No. 10 blue annealed; 4.65c. to 4.75c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Structural Material.—The building industry in this district shows little change from the previous week, although there is growing uncertainty as to the immediate outcome of the dispute between union labor and contractors. To date there has been no serious interference with work under way, but in some quarters it is felt that many projects which are in the early stages of preparation will be held back. Structural shops in this territory are well booked, the average being in the neighborhood of three months. Fabricators are showing no inclination to stock and are still depending upon prompt shipments from mills. A fair estimate of mill schedules on plain material is from four to six weeks, and the tendency at the moment is for these schedules to extend. The volume of construction in Illinois in April showed a loss of 26 per cent from March of this year and 36 per cent from April of last year. Building and engineering work started in Illinois during the first four months of this year is approximately 9 per cent below what was undertaken in the same period of last year. New construction started in Chicago during the last four months averages 5 per cent below that for the first four months of 1925. Mill prices for plain material are steady.

The mill quotation on plain material is 2.10c. per lb. base, Chicago.

Bars.—Demand for soft steel bars continues to grow and it is estimated that orders to mills so far in May are fully 50 per cent in excess of those for the corresponding period of April. A good share of this tonnage is being taken by manufacturers of tractors. Reinforcing bar dealers are also finding business more active and are specifying more heavily. Deliveries from the mills are averaging about five weeks. The Chicago mill price of 2.10c. is steady. Prices of alloy steel bars are holding and mill operations range from 80 to 85 per cent. Orders booked by bar iron mills have been about equal to those for the previous week. The railroads are the most active users in this market at the moment. Rail steel bars are in greater demand for concrete reinforcing, but general manufacturing consumers appear to be working into a seasonal slump. As a general thing, specifications for May are holding at about the same level as for April. Orders for fence posts are still heavy, and makers look for this to continue.

Mill prices per lb. are: Mild steel bars, 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 2c., base, Chicago.

Rails and Track Supplies.—Approximately 80,000 tons of standard-section rails have been purchased for

delivery during the second half of this year. New inquiries total more than 25,000 tons. The Chesapeake & Ohio has placed 30,000 tons, of which 12,000 tons were taken by the Illinois Steel Co., 12,000 tons by the Inland Steel Co., and 6000 tons by the Bethlehem Steel Co. Fastenings, which will total 4500 tons, will be distributed on the basis of the rail allotment. The Southern Railway has placed 48,600 tons of rails, 42,600 tons of which went to the Tennessee Coal, Iron & Railroad Co., 4000 tons to the Bethlehem Steel Co., and 2000 tons to the Illinois Steel Co. Track fastenings to the extent of 7250 tons were distributed with the rails. The Southern Pacific is in the market for 24,000 tons of rails, but it is probable this tonnage will be placed with the Tennessee Coal, Iron & Railroad Co. Miscellaneous orders of track supplies to local mills totaled 4000 kegs of spikes and 700 tons of steel tie plates. An eastern railroad with a terminal at Chicago placed 600 tons of steel tie plates at 2.35c., Chicago district mill. Rail mill schedules continue heavy, and makers are still feeling the pressure of the demand for prompt shipments.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, $36 to $38 per gross ton, f.o.b. maker's mill.
Standard railroad spikes, 2.90c. to 3c. per lb. mill; track bolts with square nuts, 3.90c. to 4c. mill; steel tie plates, 2.25c. to 2.35c., mill; angle bars, 2.75c., mill.

Wire Products.—The actual consumption of wire products is in fair volume, but buyers will not take out more than their immediate requirements. Demand for nails is not heavy and does not appear to be in proportion to the current volume of building. This is looked upon by some as due to an overexpansion of the industry, but others are of the belief that the substitution of other building materials for wood is the most important reason. Buying by the jobbing trade shows little change, and producers believe the present rate of demand will be carried through May and well into June. This is based on the fact that the present season is three to four weeks later than usual. Mill operation is not above 55 to 60 per cent. Prices of wire products, which are steady, are shown on page 1451.

Bolts, Nuts and Rivets.—Current specifications are light, and the total volume is considerably below that for the early part of the month.

Coke.—Shipments of by-product foundry coke are heavy, and quotations are steady at $9.75, ovens, or $10.25, delivered in the Chicago switching district.

Hot-Rolled Strip.—There is a substantial demand for this commodity and prices are steady at 2.60c., base per lb., Chicago, for all gages 6 in. and narrower, and 2.50c. for wider gages.

Cast Iron Pipe.—It is reported here that Detroit in closing its recent inquiry for 6 and 8-in. Class B pipe awarded 1650 tons to the National Cast Iron Pipe Co., a like tonnage to the United States Cast Iron Pipe Co., 350 tons to the American Cast Iron Pipe Co., and a small tonnage of one size to the Central Foundry Co. The National Cast Iron Pipe Co. this week booked 335 tons of 6 to 14-in. pipe for Birmingham, Mich., and 130 tons of 6 and 8-in., Class B pipe for Jackson, Mich. Detroit will open bids May 20 on 1050 tons of 16-in. Class H special lugged pipe, and Kohler, Wis., will receive tenders on 250 tons of 6, 8 and 10-in. Class B sand-cast pipe. Bids for the Bloomington, Ill., sewage plant have been thrown out and new figures will be asked. Chicago delivered prices for 6-in. and larger diameter pipe still range from $49.20 to $50.20, but the bulk of the tonnage is being taken nearer the lower figure.

We quote per net ton, delivered Chicago, as follows: Water pipe, 4-in., $53.20 to $54.20; 6-in. and over, $49.20 to $50.20; Class A and gas pipe, $4.

Reinforcing Bars.—The market is gradually taking on more activity, but is not yet up to the anticipations of the local trade. Shipments from warehouses are on the upgrade and are somewhat improved over those of April, but not so heavy as a year ago at this time. Architects are busy and are pressing to completion a fair number of large tonnage projects. Contracts are signed and bonds arranged for on a Cook County Hospital addition, 1200 tons, and 500 tons for an extension to the Crawford Avenue power station of the Commonwealth Edison Co. will probably be closed this week. An apartment building contract just closed calls for 650 tons of rail steel. The Chicago warehouse price for billet steel reinforcing bars is steady at 2.60c. and 2.75c. is being done on contracts of 20 tons and less. Awards placed this week and fresh inquiries are shown on page 1452.

Old Material.—Scrap prices continue to pursue a downward trend as shipments from the railroads and industrial plants appear in greater volume. Heavy melting steel is quoted nominally at $12 to $12.25, and it is doubted whether more than $12 could actually be obtained. Dealers' yards have virtually ceased to function, since the tonnage appearing on track meets most demands of users. Buyers are not carrying heavy stocks, and they are not inclined to buy beyond requirements for the next 60 to 90 days. The Santa Fe is reported to have received $13.05 per gross ton, delivered, for the 1000 tons of heavy melting steel in a recent list.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

	Per Gross Ton	
Heavy melting steel	$12.00 to	$12.25
Frogs, switches and guards, cut apart, and miscellaneous rails	13.75 to	14.25
Shoveling steel	12.00 to	12.25
Hydraulic compressed sheets	10.00 to	10.50
Drop forge flashings	9.00 to	9.50
Forged, cast and rolled steel car wheels	16.00 to	16.50
Railroad tires, charging box size	16.25 to	16.75
Railroad leaf springs, cut apart	16.00 to	16.50
Steel couplers and knuckles	15.00 to	15.50
Coil springs	16.50 to	17.00
Low phos. punchings	15.00 to	15.50
Axle turnings, foundry grade	13.00 to	13.50
Axle turnings, blast furn. grade	11.25 to	11.75
Relaying rails, 56 to 60 lb.	25.00 to	26.00
Relaying rails, 65 lb. and heavier	26.00 to	31.00
Rerolling rails	15.00 to	15.50
Steel rails, less than 3 ft.	16.00 to	16.50
Iron rails	13.50 to	14.00
Cast iron borings	9.50 to	10.00
Short shoveling turnings	9.50 to	10.00
Machine shop turnings	7.25 to	7.75
Railroad malleable	16.50 to	17.00
Agricultural malleable	15.50 to	16.00
Angle bars, steel	14.00 to	14.50
Cast iron car wheels	15.00 to	15.50
Per Net Ton		
No. 1 machinery cast	15.75 to	16.25
No. 1 railroad cast	14.75 to	15.25
No. 1 agricultural cast	14.50 to	15.00
Stove plate	12.50 to	13.00
Grate bars	12.00 to	12.50
Brake shoes	11.25 to	11.75
Iron angle and splice bars	13.00 to	13.50
Iron arch bars and transoms	18.50 to	19.00
Iron car axles	23.50 to	24.00
Steel car axles	17.00 to	17.50
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	10.75 to	11.25
No. 1 busheling	9.25 to	9.75
No. 2 busheling	5.50 to	6.00
Locomotive tires, smooth	15.50 to	16.00
Pipes and flues	8.50 to	9.00

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Mild steel bars	3.00c.
Reinforcing bars, billet steel	2.60c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Hoops	4.15c.
Bands	3.65c.
No. 28 black sheets	4.10c.
No. 10 blue annealed sheets	3.50c.
No. 28 galvanized sheets	5.25c.
Standard railroad spikes	3.55c.
Track bolts	4.55c.
Structural rivets	3.50c.
Boiler rivets	3.70c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	47½
Coach or lag screws	55 and 5
Hot-pressed nuts, square, tapped or blank,	3.25c. off per lb.
Hot-pressed nuts, hexagons, tapped or blank,	3.75c. off per lb.
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base, per keg	3.05
Cement coated nails, base, per keg	3.05

Cleveland

Building Strike Settlement Releases Steel Orders—Bars Decline to 1.90c.

CLEVELAND, May 18.—The demand for steel bars, plates and structural material is fair, holding up to the volume of recent weeks, but orders are mostly in specifications against contracts. A moderate volume of new business in plates is coming out in small lots. However, customers as a rule are ordering only for their early requirements. The most important development of the week in the price situation is a concession of $2 a ton to 1.90c., Pittsburgh, on steel bars by some of the mills for good-sized lots and desirable specifications. For small lots 2c. is still being quoted.

Building work was resumed in Cleveland Monday after an almost complete suspension of 11 weeks, due to a strike of common laborers, who returned to work at their old wages. This cessation of building resulted in holding up mill shipments of considerable structural material and reinforcing bars, some of which has already been released. The ending of the strike is expected to be followed by considerable construction activity, as the awards of a number of building contracts were being held up pending a settlement of the strike.

The demand for steel from the automotive industry is being maintained at recent restricted volume. One Detroit motor car builder is planning to increase production in June. Some are running at close to maximum capacity, and the operations of others are sharply curtailed. Reports indicate that stocks of cars are still large. The restricted demand for steel from the automotive industry is being seriously felt by the sheet and cold-rolled strip mills, and sheet prices have further weakened under the pressure for business. Plates and structural material are firm at 1.90c., base, Pittsburgh.

Pig Iron.—The market was not so active as during the previous week. However, two Cleveland interests have sold a total of 25,000 tons of iron. Included were several lots aggregating 8000 tons for the third quarter. A Detroit foundry bought 2000 tons of malleable iron, and there were some other sales in lots up to 2000 tons, but a large share of the business was in small tonnages. Sales in the Cleveland territory were very light. Inquiry is less active than a week ago. Some consumers apparently think prices will go no lower. Otherwise they doubtless would withhold third quarter purchases. The general feeling in the trade, however, is that pig iron will not advance, and there is a possibility of a further decline. Consequently most consumers see no incentive to buy except for early requirements. There is very little change in the price situation. The price of $18.50, furnace, has become more common on foundry iron in the Valley district, and, in fact, now appears to be the generally recognized price for shipment to competitive points. In Cleveland, $19.50, furnace, is the ruling price for local delivery, but because of keen competitive conditions there is no recognized price for outside shipment, quotations depending largely on the point of delivery. In western Ohio and Indiana prices range from $20 to $20.50, furnace. In Michigan nearby producers are quoting $21, furnace, but Valley and Cleveland makers, quoting $18.50, furnace, can reach some of the Michigan points at lower delivered prices than furnaces with low freight rates that quote $21. Shipments to some of the Michigan automobile foundries have fallen off considerably.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6.01 from Birmingham:

Basic, Valley furnace	$18.50
N'th'n No. 2 fdy., sil. 1.75 to 2.25	20.00
Southern fdy., sil. 1.75 to 2.25	$26.51 to 28.01
Malleable	20.00
Ohio silvery, 8 per cent	30.52
Standard low phos., Valley furnace	27.50

Alloy Steel.—The demand is not active, but leading producers are still comfortably filled with orders. Prices generally are untested, although round-lot business might bring out concessions. Chrome vanadium bars and nickel chrome vanadium have settled down to the prices that have appeared recently as minimum quotations.

Semi-Finished Steel.—Sales are limited to small lots, which are bringing regular quotations. Most sheet mills are under contracts, and specifications against these sheet bar contracts are light.

Sheets.—Demand is light, and competition for business and efforts to get it at the expense of prices have become more keen. On black sheets 3.05c., base, Pittsburgh, has become more common. While blue annealed sheets are holding steadily at 2.40c., Pittsburgh, this grade has sold at as low as 2.30c. Galvanized sheets are weak. It has been definitely established that a price of 4.25c. has appeared on these, but 4.40c. is the common price. The extreme quotations in different grades have usually been made for immediate shipment business. Some mills have been canvassing the trade with low prices for prompt shipment, but their concessions do not appear to have brought out much business. Automobile body sheets are firm at regular quotations.

Cold-Rolled Strip Steel.—While some new business is coming from the automotive industry, it is not enough to keep mills filled up. Although leading producers recently have been trying to hold to the regular price of 3.75c., Cleveland, reports of lower prices are coming from Detroit, and mills that have declined to make concessions state they are losing business because of price.

Reinforcing Bars.—Irregularity has developed in soft steel reinforcing bars on which a price of 1.90c., Pittsburgh, has appeared for car lots. Rail steel bars are unchanged at 1.80c., mill. Considerable work that has been held up pending a settlement of the local building strike is now expected to come out.

Warehouse Business.—Demand is light, but an improvement is looked for now that the local building strike has been settled. Sheet prices out of stock are irregular, but other prices are firm.

Coke.—Demand for foundry coke is very slow, and the market is weak. However, quotations are unchanged at $4 to $5.50, ovens, for standard Connellsville foundry coke. Ohio by-product foundry coke is $7.75, ovens. Heating coke has sold at $2.85, ovens. By-product coke for domestic purposes has become more active. Ohio producers are making sales at from $4.00 to $4.50, ovens.

Old Material.—There is a moderate demand from dealers for blast furnace scrap and heavy melting steel for shipment against contracts with local mills. Dealers are paying $11.25 to $11.50 for borings and turnings and $14 for heavy melting steel, delivered to Cleveland mills, but offerings of material are not large. There is little Detroit scrap coming to Cleveland. Prices on blast furnace grades in that city have not got down to a base on which, with a freight rate of $3.02, they can get into this city and meet prevailing local prices. There is no new demand from mills.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Mild steel bars	3.00c.
Cold-finished rounds and hexagons	3.90c.
Cold-finished flats and squares	4.40c.
Hoops and bands	3.65c.
No. 28 black sheets	4.10c.
No. 10 blue annealed sheets	3.25c.
No. 28 galvanized sheets	5.25c.
No. 9 annealed wire, per 100 lb	$3.00
No. 9 galvanized wire, per 100 lb	3.45
Common wire nails, base, per keg	3.00

Prices generally remain at recent levels with the market untested.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$13.50 to $13.75
Rails for rolling	15.75 to 16.00
Rails under 3 ft	17.00 to 17.50
Low phosphorus billet, bloom and slab crops	18.00 to 18.50
Low phosphorus sheet bar crops	18.00 to 18.75
Low phosphorus plate scrap	18.00
Light plate scrap	17.00
Low phosphorus forging crops	16.75 to 17.00
Cast iron borings	10.75 to 11.00
Machine shop turnings	10.25 to 10.50
Mixed borings and short turnings	10.75 to 11.00
Compressed sheet steel	12.75 to 13.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
Railroad malleable	19.50 to 20.00
Light bundled sheet stampings	11.50 to 11.75
Steel axle turnings	13.50 to 14.00
No. 1 cast	16.50 to 17.00
No. 1 busheling	11.00 to 11.25
Drop forge flashings	12.00 to 12.50
Railroad grate bars	13.00 to 13.25
Stove plate	13.00 to 13.25
Pipes and flues	11.50 to 12.00

Philadelphia

Steel Bars at 1.90c.—10,000-Ton Sale of Basic Iron—Scrap Weaker

PHILADELPHIA, May 18.—Market developments of the week were a reduction of quotations on steel bars by practically all makers from 2c., Pittsburgh, to 1.90c. on the larger lots; further weakness in steel sheets; more extensive sales of foundry pig iron at the reduction of 50c. a ton mentioned a week ago; a sale of 10,000 tons of basic iron to a plate manufacturer at $21.75, and further weakness in the scrap market, with 50c. per ton reductions on several grades.

Numerous sales of bars have been made at 1.90c., Pittsburgh, the largest being 1900 tons for buildings to be erected in Philadelphia for the General Electric Co. The weakness in sheets is most pronounced in black sheets, which are now rather freely offered at 3.15c., Pittsburgh, with 3.10c. appearing in exceptional cases. Blue annealed is holding fairly well at 2.40c., but a few sales at 2.35c. have been made. On galvanized sheets 4.40c. seems to be the minimum.

The pig iron market shows no evidence of strength, notwithstanding the fact that furnaces of this district have substantial order books. A 10,000-ton sale of basic was the largest transaction. In scrap weakness persists, with 50c. per ton declines on heavy melting steel, cast iron carwheels, No. 1 railroad wrought, No. 1 cast and a few other grades.

Pig Iron.—One nearby furnace now openly quotes $21.50, base, at furnace, on foundry grades, while another has made sales during the week at $21.50, $21.75 and $22. Sales at the low figure were more numerous in the past week than in the week preceding. A fair amount of tonnage was sold, but mostly for early delivery. There is very little interest among consumers in providing for their wants beyond the end of this quarter. A plate manufacturer bought 10,000 tons of basic iron, about half the amount it inquired for, but this will take care of its requirements through the first half of June. The price paid was $21.75, delivered, and the entire tonnage was given to one furnace. The Baldwin Locomotive Works has closed for 1600 tons of cylinder iron and a soil pipe manufacturer bought 1000 tons of foundry grades. Most of the week's buying was in lots from a carload up to 500 tons. There are three inquiries in the market for Bessemer iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.26 to $22.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.76 to 23.26
East. Pa. No. 1X	23.26 to 23.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic delivered eastern Pa.	21.75 to 22.25
Gray forge	22.00 to 22.50
Malleable	22.50 to 23.00
Standard low phos. (f.o.b. furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00

Ferroalloys.—One domestic producer of ferromanganese is now asking $90, furnace, but sales are few, as most consumers are well covered. Current inquiries are for carload lots.

Billets.—With only small-lot sales to test the market, billets remain at $35, Pittsburgh, for rerolling quality and $40 for forging quality.

Plates.—Sales of plates have shown a slight falling off, but the price remains fairly firm at 1.90c., Pittsburgh. Small sales predominate, as many of the larger consumers are still protected at lower prices on contracts or special arrangements entered into prior to the advance effective April 1. On the whole, the plate mills feel quite satisfied with the situation, as there is very little question as to price on such new business as is now coming to them.

Structural Shapes.—Letting of construction work involving steel has been a little more active, five jobs in this district which were closed within the week taking a little more than 3000 tons. The largest was a restaurant building for the Horn & Hardart Co., 1300 tons. The price situation remains unchanged. One or two mills are quoting 1.80c. and 1.85c., Pittsburgh, on the more desirable lots, while other mills adhere to 1.90c.

Bars.—Quotations of 1.90c., Pittsburgh, on steel bars, which have been given to the railroads, the larger jobbers and other special customers for some weeks, have now been extended to apply to some of the smaller orders. Most of the mills are now naming 1.90c. on lots of a carload or more, provided the rolling is desirable. A sale of 1900 tons of concrete reinforcing bars at this price was made for manufacturing buildings to be erected here for the General Electric Co.

Sheets.—Black sheets are weaker than any of the other grades, due largely to the number of mills which roll black sheets and no other kind. Quotations of 3.15c., Pittsburgh, are more common, and 3.10c. has appeared in isolated instances. On blue annealed sheets most of the current sales are at 2.40c., but 2.35c. has been done by a few buyers. Galvanized sheets are fairly well held at 4.40c.

Imports.—Pig iron imports last week amounted to 4200 tons at Philadelphia, of which 3250 tons came from Germany and 950 tons from the Netherlands. Other imports were as follows: Chrome ore from Portuguese East Africa, 3024 tons; iron ore from Sweden, 7051 tons; steel bars from the Netherlands, 94 tons; steel bars from Belgium, 156 tons; steel billets from the Netherlands, 48 tons; structural steel from Belgium, 404 tons; structural steel from Germany, 64 tons; galvanized steel strips from England, 16 tons.

Old Material.—A plate manufacturer has bought about 10,000 tons of heavy melting steel at $15.50,

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Tank steel plates, ¾-in. and heavier	2.80c. to 3.00c.
Tank steel plates, ¼-in.	3.00c.
Structural shapes	2.75c. to 2.90c.
Soft steel bars, small shapes and iron bars (except bands)	3.00c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	4.00c. to 4.25c.
Steel bands, No. 12 gage to ¼-in., inclusive	3.75c. to 3.90c.
Spring steel	5.00c.
No. 28 black sheets	4.55c.
No. 10 blue annealed sheets	3.50c.
No. 28 galvanized sheets	5.75c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Tool steel	8.50c.
Swedish iron bars	6.00c. to 6.50c.

delivered, and it is doubtful whether anything above that figure could be had today. The largest Eastern consumer is offering only $14.50. Brokers are paying from $14.50 to $15 on old orders. Other grades are also weaker, reductions of 50c. a ton being effective on cast iron car wheels, No. 1 railroad wrought, No. 1 cast, couplers and knuckles and rolled steel wheels.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy, 0.04 per cent and under	20.00 to 20.50
Couplers and knuckles	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Cast iron car wheels	17.00 to 17.50
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	16.50 to 17.00
No. 1 forge fire	14.00
Bundled sheets (for steel works)	13.00 to 13.50
Mixed borings and turnings (for blast furnace)	12.50 to 13.00
Machine shop turnings (for steel works)	13.00 to 13.50
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mill)	13.50
Cast borings (for chemical plant)	15.50 to 16.00
No. 1 cast	17.00 to 18.00
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars	13.50 to 14.00
Stove plate (for steel works)	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	21.00 to 22.00
Steel axles	22.50 to 23.00

Elected Sales Manager of McKinney Steel Co.

J. S. McKesson was elected sales manager of the McKinney Steel Co., Cleveland, at the annual meeting May 17, succeeding Harry W. Haggarty, who recently resigned. Mr. McKesson was for many years in charge of sales for the company in the Pittsburgh territory and was recently transferred to Cleveland as assistant sales manager. Two new directors were elected, H. P. Harrison, the general manager, and Andrew Squire, attorney, succeeding Price McKinney and W. D. Turner, both deceased.

Effects Merger of Cleveland Bolt and Nut Makers

The merger of the Lamson & Sessions Co. and the Kirk-Latty Mfg. Co., Cleveland, makers of bolts, nuts and rivets, for which negotiations have been under way for some time, was effected May 18. The Kirk-Latty plant for the present, at least, will be operated as a separate unit with Fred H. McIsaac, who has been president of that company, as general manager. I. L. Jennings, secretary and sales manager of the Lamson & Sessions Co., will have charge of sales of both plants.

An exposition of the mining industry will be held in connection with the International Fair at Prague, Czechoslovakia, Aug. 29 to Sept. 5. The plan is to have the exposition cover "everything the mines produce and everything they need." The exhibition is to cover mine products, briquetting of coke, machinery and equipment for mining. A group will be devoted to fuels, comprehending the manufacture of coke from coal and from lignite, the recovery of by-products, industrial furnaces, pulverized coal, ventilating apparatus. There will be an exhibit also of laboratories and engineering firms specializing in mining and industrial applications of heat. Detailed information may be obtained by addressing Direction de la Foire de Prague, Prague VII, Veletrzni trida, Czechoslovakia.

Standard specifications for quenched carbon steel track bolts as adopted by the American Society for Testing Materials have been translated into Spanish and form another one of the series of industrial standards planned for the convenience of Latin America by the Department of Commerce and obtainable at 5c. a copy from the Superintendent of Documents, Government Printing Office, Washington.

New York

Pig Iron Buying Confined to Small Lots —Steel Bars Reduced

NEW YORK, May 18.—Pig iron buying is restricted mainly to small tonnages for early shipment. There were few individual orders during the past week that covered more than 500 tons, although a considerable number of smaller lots were placed. Total sales in this district for the week are estimated at 7500 tons. The A. P. Smith Mfg. Co., East Orange, N. J., bought 600 tons of foreign foundry iron, and the Crompton & Knowles Loom Works, Worcester, Mass., closed for a like tonnage of domestic iron. Prices of domestic iron remain unchanged, with eastern Pennsylvania iron holding at $21.50, base furnace, and Buffalo iron at $21, base furnace. Prices on foreign iron, owing to the fact that less distress tonnage is being pressed for sale, are somewhat steadier. Continental iron can still be bought for $20, duty paid port of entry, or possibly a shade lower, but Indian foundry iron has brought $21.50, base, duty paid. Excluding an export inquiry for 1500 tons of special analysis iron, pending business totals 2000 to 3000 tons.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

East Pa. No. 2 fdy., sil. 1.75 to 2.25	$24.02 to $24.52
East Pa. No. 2X fdy., sil. 2.25 to 2.75	24.52 to 25.02
East Pa. No. 1X fdy., sil. 2.75 to 3.25	25.02 to 25.52
Buffalo fdy., sil. 1.75 to 2.25 (all-rail)	25.91
Buffalo fdy., sil. 1.75 to 2.25 (by barge canal, del'd alongside in lighterage limits, N. Y. and Brooklyn)	23.75
No. 2 Virginia fdy., sil. 1.75 to 2.25	27.54 to 29.54

Ferroalloys.—The absence of any inquiry or sales of ferromanganese continues and prices are unchanged. Business in spiegeleisen is confined to carload and small lots. Specifications on contract continue fairly satisfactory for these alloys. Very little new business is reported for ferrosilicon or ferrochromium with specifications up to expectations.

Warehouse Business.—The current month is proving much better than April. Prices are somewhat firmer on most products with the possible exception of galvanized sheets, which are reported to be occasionally offered by small dealers at slight concessions from the established schedule of 5.65c. per lb. Quotations on bars and shapes show little or no deviation from the base of 3.24c. and 3.34c. per lb.

Cast Iron Pipe.—The market continues quiet with prices showing considerable firmness. No new inquiries of any size are reported. The Havana Electric Co., Havana, Cuba, is expected to close shortly on close to 4000 tons of pipe. The contract at Union Beach, N. J., calling for the installation of cast iron pipe is reported to have been let to the W. E. Sexton Co., Mineola, L. I.

We quote pressure pipe per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $50.60 to $52.60; 4-in. and 5-in., $55.60 to $57.60; 3-in., $65.60 to $67.60; with $5 additional for Class A and gas pipe.

Finished Steel.—One or two mills have definitely reduced their quotations on steel bars from 2c. to 1.90c., Pittsburgh, and others are meeting the lower price when obliged to do so. There have been rather frequent concessions in the past two weeks on the more attractive tonnages, but the formal reduction did not take place until the middle of last week. On plates the price situation remains fairly firm, but there have been scattered sales of narrow plates at a concession of $1 a ton from 1.90c., Pittsburgh, the price which has been in effect since the beginning of the second quarter. Sheets show no further weakness, except that the number of sales at the lower prices has shown an increase. On black sheets 3.15c., Pittsburgh, is the usual quotation on anything desirable, while on other

lots 3.20c. is named. Galvanized sheets have not gone below 4.40c., but higher than that is seldom attainable. Blue annealed sheets are 2.40c., Pittsburgh, with 2.35c. appearing in spots. The larger makers of structural shapes continue to adhere to 1.90c., Pittsburgh, but lower prices are to be had from one or two Eastern mills. The volume of steel business shows little change from that of last March. The general report is that orders in the first half of May were fully up to the tonnage booked in this district in the first half of April. While there has been a slight falling off in some lines, there has been a gain in others, so that the average is about the same.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.24c. to 2.34c. per lb.; plates, 2.19c. to 2.24c.; structural shapes, 2.14c. to 2.24c.; bar iron, 2.24c.

Coke.—Consumers are evidently fairly well covered on current requirements and not inclined to buy more than small lots of foundry. Standard foundry shows a slight tendency to weakness despite recent curtailment of operations in the Connellsville district. Foundry coke is quoted at $8.16 to $9.41 per net ton, delivered Newark and Jersey City, N. J., $8.28 to $9.53 per ton, delivered northern New Jersey and $9.04 to $10.29, delivered New York or Brooklyn, N. Y. By-product is $9.75 to $10.77, delivered Newark or Jersey City, N. J.

Old Material.—The market is substantially unchanged except for a further slight decline in prices. No. 1 heavy melting steel is being purchased at $14.50 to $15.25 per ton, delivered eastern Pennsylvania, with shipments going forward to Bethlehem, Coatesville, Sparrows Point, Md., Claymont and Conshohocken, Pa. Borings and turnings are being purchased at $12 per ton, delivered Bethlehem, $13 per ton, delivered Sparrows Point, Md., and $12.75 per ton, delivered Coatesville, Pa. Chemical borings are quiet with most of the local consumers temporarily out of the market and $15 per ton delivered Irvington, N. J., offered by brokers. Brokers are purchasing forge fire at $13.50 per ton, delivered Coatesville, Pa.

Buying prices per gross ton, New York, follow:

Heavy melting steel (yard)	$9.75 to $10.25
Heavy melting steel (railroad or equivalent)	11.25 to 11.75
Rails for rolling	11.75 to 12.25
Relaying rails, nominal	23.00 to 24.00
Steel car axles	19.00 to 19.50
Iron car axles	21.50 to 22.00
No. 1 railroad wrought	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	12.50 to 13.00
Cast borings (steel mill)	9.25 to 9.75
Cast borings (chemical)	12.50 to 13.00
Machine shop turnings	9.00 to 9.75
Mixed borings and turnings	9.25 to 9.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.25 to 11.50
Stove plate (steel mill)	9.25 to 9.75
Stove plate (foundry)	10.25 to 10.75
Locomotive grate bars	10.25 to 10.75
Malleable cast (railroad)	16.00 to 16.50
Cast iron car wheels	13.00 to 13.50
No. 1 heavy breakable cast	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (column, building material, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 28 gage)	6.35c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts cut thread	40 and 10
Carriage bolts, cut thread	30 and 10
Coach screws	40 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
⅛-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	4	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 *x* 20 *in.*)

	Primes	Seconds
Coke, 100-lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 *x* 20 *in.*)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.30c.
Nos. 22 and 24	4.35c.
No. 26	4.40c.
No. 28*	4.50c.
No. 30	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.75c.
No. 16	4.90c.
Nos. 18 and 20	5.05c.
Nos. 22 and 24	5.20c.
No. 26	5.35c.
No. 28*	5.65c.
No. 30	6.15c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Changes in Westinghouse Sales Department Personnel

E. D. Kilburn, vice-president and general sales manager Westinghouse Electric & Mfg. Co., has approved the following appointments made by T. J. Pace, recently appointed director of sales: T. A. McDowell, supervisor of development; W. C. Koehler, supervisor of costs; C. F. Lloyd, supervisor mixed apparatus negotiations; M. H. Scott, chief clerk. Motor apparatus: O. F. Stroman, manager; large motor, R. O. Watson; synchronous motor, C. D. Kester; medium a. c. motor, J. R. Olnhausen; medium d. c. motor, C. B. Stainback; motor-generator and welding, W. H. Reddie; small power motor, D. H. Byerly (East Springfield); cost, F. W. Horst. Generating apparatus: H. W. Smith; d. c. power apparatus, F. J. Lewis; a. c. power apparatus, J. A. Brown; power transformers, A. P. Bender (Sharon); cost, S. R. Shave. Traction apparatus: A. J. Manson; heavy traction, T. C. Wurts; light traction, E. A. Palmer; propulsion, W. B. Bassett; line material, L. F. Brahmer; renewal parts, A. B. Gibson; cost, E. P. Gooch. Switchgear apparatus: R. A. Neal; switchboards and oil circuit breakers, N. S. Taylor; automatic switching, R. F. Frenger; switchboard devices, T. S. Watts; cost, H. E. Haldeman. Distribution apparatus: G. A. Sawin; street lighting, L. A. S. Wood (South Bend); porcelain, G. I. Gilchrest (Derry); insulation, E. H. Ott; instrument, R. T. Pierce (Newark); distribution transformers, A. C. Farmer (Sharon); meters, S. A. Berger (Newark); feeder regulations, C. R. Gilchrest; protective, P. F. Squier; cost, I. L. Burkhart.

San Francisco

Sale of 1500 Tons of German Iron at $23.50—Coke Advances 50c.

SAN FRANCISCO, May 15 (*By Air Mail*).—A local importer has disposed of 1500 tons of German foundry iron at $23.50, duty paid, f.o.b. cars in the San Francisco and Los Angeles districts. A shipment of 5220 tons of English and German by-product coke arrived during the week. German by-product coke is being offered at $11.50 to $12 per ton at incoming dock, and English by-product is being quoted at $12 to $14. Orders for futures are being taken at 50c. higher. A local broker is understood to have offered German iron at $21, duty paid, for June-July shipment, but confirmation is lacking.

Conservative buying is the rule in nearly all departments of the market, and few fresh inquiries have developed. The local carpenters' strike continues, and its effect on building operations is becoming more apparent. The letting of a number of contracts has been postponed, and the municipal government is endeavoring to discover a basis for a compromise.

The East Bay Municipal Utility District, Oakland, Cal., has applied to the State Division of Water Rights for a permit to develop hydroelectric power at the base of the Lancha Plana dam site on the Mokelumne River, and an early decision is expected. The power rights sought by the district provide for the use of water flow at the dam site to generate power estimated at 14,000 hp. The water flow is about 375 cu. ft. per sec.

Pig Iron.—Aside from the sale of 1500 tons of German foundry iron in the San Francisco and Los Angeles districts during the week, there has been little activity. A local importer expects a shipment of Indian iron the latter part of this month, which is being offered at $24.50, duty paid, f.o.b. cars, San Francisco.

	Per Gross Ton
*Utah basic	$26.00 to $27.00
*Utah foundry, sil. 2.75 to 3.25	26.00 to 27.00
**English foundry, sil. 2.75 to 3.25	25.00
**Indian foundry, sil. 2.75 to 3.25	24.50
**German foundry, sil. 2.75 to 3.25	23.00 to 23.50
**Dutch foundry, sil. 2.75 to 3.25	22.50
**Belgian foundry, sil. 2.75 to 3.25	22.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Bids have closed on several projects, but few large awards have been made. Lettings total 1115 tons, the largest individual award being 450 tons for three highway bridges for the Oregon Highway Commission, Portland. The Judson Mfg. Co., Oakland, Cal., has taken 365 tons for the Frick School in Oakland, and the Herrick Iron Works, Oakland, has been awarded 200 tons for the Odd Fellows Hall, Berkeley, Cal. Bids will be closed May 25 on 182 tons for two highway bridges for the Oregon Highway Commission. Eastern mills continue to quote plain material at 2.30c. to 2.35c., c.i.f. Coast ports.

Plates.—The Shell Oil Co., Wilmington, Cal., has placed 1550 tons for five 80,000-bbl. tanks with the Llewellyn Iron Works, Los Angeles. The Thermalito Irrigation District, Oroville, Cal., which closed bids several weeks ago on 125 tons for a pipe line, has rejected all bids, and will go into the open market to buy its material. The Nevada County Irrigation District, Grass Valley, Cal., instead of buying 200 tons of plates, has placed an order with producers of wood-stave pipe. No fresh inquiries of importance have come up during the week. Eastern mills quote plates at 2.25c. to 2.30c., c.i.f. Coast ports.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.30c.
Mild steel bars and small angles	3.30c.
Small channels and tees, ¾-in. to 2¾-in.	3.90c.
Spring steel, ¼-in. and thicker	6.30c.
No. 28 black sheets	4.75c.
No. 10 blue annealed sheets	3.75c.
No. 28 galvanized sheets	6.00c.
Common wire nails, base per keg	$3.50
Cement coated nails, base per keg	3.00

Bars.—The local carpenters' strike is preventing new jobs from going ahead, and a number of contracts on which bids have closed are still pending. The Youdall Construction Co., San Francisco, has been awarded the general contract on the Sunset Tunnel, Duboce Avenue, and is expected to call for bids on 600 tons of reinforcing bars about June 1. Lettings for the week total 717 tons. Concrete bar jobbers quote as follows: 2.80c., base, per lb. on lots of 250 tons; 2.95c., base, per lb. on carload lots, and 3.20c., base, on less-than-carload lots.

Cast Iron Pipe.—The city of Glendale, Cal., has awarded 1350 tons as follows: 188 tons of 16-in. Class B to B. Nicoll & Co.; 245 tons of 24-in. Class B to the Grinell Co. of the Pacific; 217 tons of 4-in. Class B to the National Cast Iron Pipe Co., and 700 tons of 6-in., 8-in., and 12-in. Class B to the United States Cast Iron Pipe & Foundry Co. The city of Vancouver, B. C., has placed 490 tons of 6, 8 and 12-in. Class B with the Grinell Co. of the Pacific. The city of Los Angeles, Cal., has awarded 202 tons and 100 tons of 2-in. Class B to the American Cast Iron Pipe Co. and the Birmingham Machine & Foundry Co., respectively. The city of San Diego, Cal., will close bids June 1 on 277 tons of 6-in. and 10-in. Class B.

Warehouse Business.—Buying is fair and somewhat larger than it was a week ago. Prices are unchanged.

Rivets.—The Southern Pacific Co. will close bids May 28 on 180 tons of rivets.

Sheets.—Eastern mills are quoting galvanized sheets at 5.15c., c.i.f. Coast ports, which is equivalent to 4.45c. to 4.50c. base, Pittsburgh. Buying is light. Blue annealed sheets are quoted at 2.40c. to 2.50c., base Pittsburgh.

Coke.—A local importer received a shipment of 5220 tons of German and English by-product coke during the week. All orders for future shipments are quoted at 50c. higher than present quotations, which are as follows:

English beehive, $15 to $16 per ton at incoming dock, and English by-product, $12 to $14; German by-product, $11.50 to $12.

Birmingham

Pig Iron Market Unaffected by Blowing In of Furnaces—Plates Again Recede

BIRMINGHAM, May 18.—With deliveries of pig iron equaling or running ahead of output, the blowing in of two blast furnaces and the blowing out of another, making a net gain of one stack, are not expected to have any material effect on the market. Consumers continue to hold aloof from the market, but there are no indications of any recession from the going price of $22, base Birmingham, on foundry iron. Considerable iron is still due on old contracts, probably enough to cover output for the next three or four weeks. Inquiries are spasmodic, but are interpreted as indicating a real need for additional iron. Melt in the South, which takes about 90 per cent of the output of Alabama furnaces, is well maintained. The Woodward Iron Co. has blown in its No. 2 furnace, which was damaged by an accident eight weeks ago, and the Central Iron & Coal Co. has put in its stack at Holt, Ala. The Sloss-Sheffield Steel & Iron Co. has put out its No. 4 furnace at North Birmingham for relining, and expects to get it back into blast in six or seven weeks. Fourteen furnaces in this district are now producing foundry iron.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil	$22.00
No. 1 foundry, 2.25 to 2.75 sil	22.50
Basic	22.00
Charcoal, warm blast	$30.00 to 32.00

Rolled Steel.—Plates have again weakened, now ranging from 2c. to 2.15c., base Birmingham. Bars, however, are unchanged at 2.15c. to 2.25c., base Birmingham, and structural shapes remain at 2.05c. to 2.10c. Consuming industries are busy. This is especiallly true of fabricators of structural steel and tanks. Fabricating

plants continue to ship considerable material to Florida. Wire and nail demand gives promise of improving, and sheet specifications are satisfactory.

Cast Iron Pipe.—Pressure pipe shops are busy, and shipments are equal to production. Lettings are more numerous, although in many instances they are small. Among recent awards to makers in this district was a small tonnage for Birmingham, Mich. The new centrifugal pipe shop of the American Cast Iron Pipe Co. is almost completed.

Coke.—Production is steady and shipments remain in good volume. Prices on foundry coke range from $5 to $5.50, Birmingham.

Old Material.—Demand is light and prices are unchanged. Heavy melting steel consumers have not been in the market for some time, but still have a large tonnage due them. Users of old material are confident that they will be able to buy what they need when they want it at favorable prices. Hence they are in no haste to cover their future needs.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	13.00 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	18.00 to 19.00
Iron axles	18.00 to 19.00
Steel rails	18.00 to 18.50
No. 1 cast	17.00 to 17.50
Tramcar wheels	17.00 to 17.50
Car wheels	16.00 to 16.50
Stove plate	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
Cast iron borings	8.00 to 9.00
Rails for rolling	15.00 to 16.00

St. Louis

Sale of 2500 Tons of Basic Iron—Scrap Continues to Decline

ST. LOUIS, May 18.—The only pig iron sale of consequence in several weeks, 2500 tons of basic to a St. Louis melter, has been made by the Granite City furnace. This company also has sold about 600 tons of foundry grades for prompt shipment, in lots ranging from a carload to 250 tons. A few other sales of carload lots were made. Business among the stove plants is light, and there also is a falling off in the melt among jobbing foundries. The market is weak, with quotations nominal.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices, $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$22.66 to $23.16
Northern malleable, sil. 1.75 to 2.25	22.66 to 23.16
Basic	23.16 to 24.16
Southern fdy., sil. 1.75 to 2.25	24.92 to 26.42
Granite City iron, sil. 1.75 to 2.25	23.31 to 23.81

Coke.—Demand for foundry grades of coke has fallen off considerably, and the tone of the market is easier. Warmer weather has brought a decline in the demand for domestic coke, but still buying is heavier than usual for this time of year.

Finished Iron and Steel.—Small orders continue to be the rule for sheets and plates, although it is reported that the "grocery store" business being done in these lines is bulking fairly large in the aggregate. The call for reinforcing bars is light. The award of Missouri road contracts, which will require between 1000 and 1500 tons of reinforcing bars, is the chief feature of interest. Fabricators of structural steel report that business is light.

Old Material.—The market for old material remains weak. Dealers, in the belief that there will be little buying by consumers for several months, have reduced stocks in yards to the lowest point in years. Moreover, dealers are not buying anything except to fill outstanding orders. Railroad lists continue heavy despite a weak market. They include: Southern Railway, 7200 tons, and subsidiaries, 1200 tons; Rock Island Lines, 6600 tons; Wabash, 2900 tons; Chicago, Milwaukee & St. Paul, 1400 tons; St. Louis Southwestern, 300 tons, and St. Louis-San Francisco, 250 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.00 to $12.50
Rails for rolling	14.75 to 15.00
Steel rails less than 3 ft.	16.50 to 17.00
Relaying rails, 60 lb. and under	24.00 to 25.00
Relaying rails, 70 lb. and over	30.00 to 31.00
Cast iron car wheels	15.50 to 16.00
Heavy melting steel	12.00 to 12.50
Heavy shoveling steel	12.00 to 12.50
Frogs, switches and guards cut apart	13.50 to 14.00
Railroad springs	16.00 to 16.50
Heavy axle and tire turnings	8.50 to 9.00
No. 1 locomotive tires	16.00 to 16.50
Per Net Ton	
Steel angle bars	12.00 to 12.50
Steel car axles	17.00 to 17.50
Iron car axles	21.50 to 22.00
Wrought iron bars and transoms	18.00 to 18.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.25
Cast iron borings	9.50 to 10.00
No. 1 busheling	10.50 to 11.00
No. 1 railroad cast	14.00 to 14.50
No. 1 machinery cast	16.50 to 17.00
Railroad malleable	13.50 to 14.00
Machine shop turnings	5.75 to 6.25
Bundled sheets	6.50 to 7.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, mild steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
No. 28 black sheets	4.60c.
No. 10 blue annealed sheets	3.60c.
No. 28 galvanized sheets	5.70c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.75c.
Structural rivets	3.65c.
Boiler rivets	3.85c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller	70
Machine bolts	50 and 5
Carriage bolts	47½
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	3.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

Cincinnati

Low Lake Furnace Prices Fail to Bring Out Buying—Nails Weak

CINCINNATI, May 18.—Pig iron buyers are manifesting little interest, and sales in the past week dropped to the lowest point of the year. Even the appearance of prices as tempting as $18.25, furnace, on No. 2X foundry, the quotation made locally by a Cleveland producer, has failed to bring out any sizable tonnages. Furnaces in the Ironton district are not meeting the competition of Lake sellers, preferring, instead, to hold to $20, base Ironton, for the moment. However, there has been no important inquiry to test the stability of that price. Tennessee iron is unchanged at $20.50, base Birmingham, and Alabama iron is unable to move into this territory at its present price of $22, base Birmingham. A few scattered sales of Jackson County silvery iron have been made. It is understood that the Wagner Mfg. Co., Sidney, Ohio, has bought 300 tons of 6 per cent at $25.50, furnace, for delivery over the remainder of the year. Two inquiries for 400 tons of foundry iron, each from central Ohio, probably will be closed this week. Otherwise prospective business is exceedingly light. Consumers are confident that there soon will be a further reduction in prices. Accordingly they are buying sparingly, hoping to make further purchases to better advantage in the next month or two.

Based on freight rates of $3.69 from Birmingham and $1.89 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	$25.69
Alabama fdy., sil. 2.25 to 2.75	26.19
Tennessee fdy., sil. 1.75 to 2.25	$24.19 to 24.69
Southern Ohio silvery, 8 per cent	30.39
So. Ohio fdy., sil. 1.75 to 2.25	21.89
So. Ohio malleable	21.39 to 21.89

Reinforcing Bars.—While there are several moderate size projects pending, there have been no awards of consequence. New billet bars remain at 2c., Cleveland, and rail steel bars at 1.90c., mill.

Warehouse Business.—Sales in the first half of May have fallen about 15 per cent below those in the corresponding period in April. Jobbers attribute the decrease principally to the light demand for structural steel and reinforcing bars, although all products have suffered somewhat because of the quiet market. Prices, however, are firm.

Finished Material.—Both specifications and orders have been somewhat disappointing, with the result that the volume of business in the first two weeks of May has been less than that in the corresponding period last month. Industrial consumers, now operating only at a moderate rate, are buying cautiously and are disposed to "shop around" before making purchases. While jobbers have meager stocks in their warehouses, they are confining their orders to small lots for immediate delivery. There has been little change in prices, although the severe competition for nail business in this territory has had a depressing effect upon that commodity. The sheet market, which has shown signs of weakness for the past month, still is tending toward lower levels. The demand for bars at 2c., base Pittsburgh, has been about normal. A consumer in this district has bought 3600 tons of angle and channel bars. Plate inquiries have been better, and prices appear to be steady at 1.90c., base Pittsburgh, although an independent mill is reported to be quoting 1.85c. Structural shapes are firm at 1.90c., base Pittsburgh. An Ironton, Ohio, mill is offering common wire nails at $2.75 per keg, delivered in Cincinnati at the river bank. This makes the buyers here responsible for the haulage charges to their warehouses. It is reported, but not confirmed, that an Eastern producer has quoted a delivered price on common wire nails at $2.75, even though shipments must be made by rail. Such a quotation figures back to $2.46, mill. Plain wire is bringing $2.50 per 100 lb., base Ironton. Black sheets range from 3.15c. to 3.25c., base Pittsburgh, with sales confined to small quantities. Galvanized and blue annealed are being sold at 4.40c. and 2.40c., base Pittsburgh, respectively. Bookings of automobile body sheets have been only fair, and quotations as low as 4.25c., base Pittsburgh, have been made.

Coke.—Specifications for by-product foundry coke have been running slightly behind those on April, but several dealers report that the shipments of by-product domestic grades have been above normal for this time of the year. Sales of beehive foundry coke have been confined principally to single carloads. Prices are steady and are not likely to change in the immediate future.

Based on freight rates of $2.14 from Ashland, Ky., $3.53 from Connellsville, and $2.59 from Wise County ovens and New River ovens, we quote f.o.b. Cincinnati: Connellsville foundry, $7.53 to $9.53; Wise County foundry, $6.84 to $7.59; New River foundry, $9.59 to $10.09; by-product foundry, $10.14.

Old Material.—Under the strain of what approximates almost a total suspension of mill buying, prices again have broken 50c. a ton on many items, including heavy melting steel. It is reported that the heavy melting steel offered last week by a railroad brought the lowest figure in many months. Foundries in this territory are buying only in small quantities for immediate delivery.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.50 to 12.00
Short rails	16.50 to 17.00
Relaying rails	27.00 to 27.50
Rails for rolling	13.00 to 13.50
Old car wheels	12.50 to 13.00
No. 1 locomotive tires	16.50 to 17.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	13.50 to 14.00
Loose sheet clippings	6.50 to 7.00
Champion bundled sheets	8.50 to 9.00

Per Net Ton

Cast iron borings	6.50 to 7.00
Machine shop turnings	6.00 to 6.50
No. 1 machinery cast	17.00 to 18.00
No. 1 railroad cast	13.50 to 14.00
Iron axles	20.00 to 20.50
No. 1 railroad wrought	8.50 to 9.00
Pipes and flues	7.00 to 7.50
No. 1 busheling	8.50 to 9.00
Mixed busheling	6.50 to 7.00
Burnt cast	6.50 to 7.00
Stove plate	8.50 to 9.00
Brake shoes	9.00 to 9.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, mild steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5c.
No. 28 black sheets	4.10c. to 4.30c.
No. 10 blue annealed sheets	3.60c.
No. 28 galvanized sheets	5.25c. to 5.40c.
Structural rivets	3.75c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100-lb. keg	3.15
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Buffalo

Pig Iron Still Holding at $21—Sheet Demand Improves

BUFFALO, May 18.—The market is unusually quiet, with fresh inquiry very light and no important tonnages pending. The tonnage booked in small lots is fair, but melters are still playing a waiting game. Foundry stocks are reported to be low, and one of the encouraging features of the present situation is the high rate of shipments from furnaces. Little iron is being accumulated in furnace yards, and the way the foundries are absorbing it indicates that the melt is good. Prices appear to be firm at $21, base furnace, for foundry iron, and prospects of a lower market appear remote.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Mild steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
No. 28 black sheets	4.60c.
No. 10 blue annealel sheets	3.90c.
No. 28 galvanized sheets	5.75c.
Common wire nails, base per keg	$3.90
Black wire, base per 100 lb	3.90

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain fdy., sil. 1.75 to 2.25	$21.00
No. 2X foundry, sil. 2.25 to 2.75	21.50
No. 1X foundry, sil. 2.75 to 3.25	22.50
Malleable, sil. up to 2.25	21.00
Basic	20.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Inquiry is not particularly active in any line, though a definite improvement is reported in the sheet demand. Black sheets are quoted at 3.25c. to 3.35c., base Pittsburgh, and automobile body sheets at 4.30c. It is possible that a good desirable inquiry for black might bring out 3.15c., Pittsburgh. Sheet mills are operating 75 per cent in this district. Bars are firm at 2.265c., Buffalo, and there is little change in the shape and plate markets. Bolt and nut prices are firm, with specifications fair.

Old Material.—There is considerable activity among dealers, who are paying as high as $15.50 to $15.75 for heavy melting steel to apply on the order taken at $16 to $16.25 during the previous week. They are also seeking hydraulic compressed and No. 1 busheling at about $1 a ton under these quotations. One mill is confident it can purchase the grade of heavy melting steel it uses for under $15, and has secured some ton-

nage at $14.50. There is some stove plate buying at $14.50, with demand better than for some time. A sale of No. 1 cast scrap at $16.25 is noted.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$14.50 to $15.00
Selected No. 1 heavy melting steel	16.00 to 16.25
Low phosphorus	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
Car wheels	17.00 to 17.50
Machine shop turnings	9.50 to 10.50
Mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
Stove plate	14.00 to 14.50
Grate bars	13.00 to 13.50
Hand-bundled sheets	10.00 to 10.50
Hydraulic compressed	14.50 to 15.00
No. 1 machinery cast	16.25 to 16.50
Railroad malleable	21.00 to 22.00
Iron axles	24.00 to 25.00
Steel axles	16.00 to 16.50

Boston

Structural Work in Prospect—Sheets Decline—Recessions in Scrap

BOSTON, May 18.—A fair amount of local structural work is in prospect, and keen interest continues to center in the Keith Memorial Theater and the Motor Mart. The latter will require 250 tons, besides a fair tonnage in reinforcing steel. These are the most active pending jobs, but among those in prospect is the new Young's Hotel, Boston, which will contain 1000 rooms. A new building for the Boston *Herald* will call for a fairly heavy tonnage. The market situation in plates and sheets remains unchanged. Buying is from hand to mouth, with the prices of plates unchanged at 1.90c., base Pittsburgh. Sheets are weaker, galvanized having receded to 4.40c., base Pittsburgh, and black to 3.25c. The lower prices have failed to bring out buying beyond immediate needs.

Pig Iron.—It has been another quiet week, and among the few sales of any size was one of about 600 tons to a Worcester company. This business is said to have gone to the Troy, N. Y., furnace. There have been some carload sales, which served to make the week somewhat better than the previous one. A factor in looking ahead is the fact that German low-priced pig iron is disappearing from the market.

We quote delivered prices on the basis of the latest sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$25.15 to $25.65
East. Penn., sil. 2.25 to 2.75	25.65 to 26.15
Buffalo, sil. 1.75 to 2.25	25.41 to 25.91
Buffalo, sil. 2.25 to 2.75	25.91 to 26.41
Virginia, sil. 1.75 to 2.25	27.92 to 29.92
Virginia, sil. 2.25 to 2.75	28.42 to 30.42
Alabama, sil. 1.75 to 2.25	28.91 to 31.60
Alabama, sil. 2.25 to 2.75	29.41 to 32.10

Warehouse Business.—Sales continue light, but prices are holding fairly well.

Old Material.—Prices in several instances have shown recessions, but without stimulating interest. The situation is not encouraging at all. Whatever little buying that has occurred in the week was for some immediate needs, and this was hardly worth mentioning.

The following prices are for gross-ton lots delivered consuming points:

Textile cast	$18.50 to $19.00
No. 1 machinery cast	16.50 to 17.00
No. 2 machinery cast	14.50 to 15.00
Stove plate	13.50 to 14.00
Railroad malleable	19.50 to 20.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.10 to $10.60
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	12.00 to 12.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	10.75 to 11.25
Machine shop turnings	8.50 to 9.00
Cast iron borings, chemical	10.50 to 11.00
Cast iron borings, rolling mill	8.50 to 9.00
Blast furnace borings and turnings	8.10 to 8.35
Forged scrap	8.35 to 8.85
Bundled skeleton, long	8.00 to 8.50
Forged flashings	9.00 to 9.50
Bundled cotton ties, long	8.25 to 8.50
Bundled cotton ties, short	9.00 to 9.50
Shafting	16.00 to 16.50
Street car axles	15.50 to 16.00
Rails for rerolling	11.50 to 12.00
Scrap rails	10.10 to 10.60

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Soft steel bars and small shapes	3.265c.
Flats, hot rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Wayne	5.50c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Plates	3.365c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hexagons	3.95c.
Squares and flats	4.45c.
Toe calk steel	6.00c.

Further Reductions in Detroit Scrap Market

DETROIT, May 18.—Still further reductions were registered in the market on old material in this district, blast furnace scrap showing a decline of 25c. per ton and hydraulic compressed registering a drop of 50c. per ton. No sales of size have been transacted, current shipments being applied against old orders.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate. No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	$13.00 to $13.50
Borings and short turnings	8.50 to 9.00
Long turnings	7.50 to 8.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	21.50 to 22.50
Hydraulic compressed	10.00 to 10.50
Stove plate	13.50 to 14.50
No. 1 busheling	11.00 to 11.50
Sheet clippings	7.00 to 7.50
Flashings	10.00 to 10.50

The modernization program of the Sharon Steel Hoop Co., Sharon, Pa., provides for the electrification of its 8 and 10-in. mills at Sharon, now operating on steam, the remodeling of the 14-in. mill, construction of a new and enlarged furnace for the 10-in. mill, and erection of a new gas house and boiler house, both mechanically equipped. The open hearth and blooming mill plant at Sharon, which have not been operated since 1919, will be dismantled this year.

"Low Foundry Costs" is the title of a new booklet of 28 pages and fully illustrated, discussing sand handling, conditioning, and mold carrying equipment, recently produced for the C. O. Bartlett & Shaw Co., by the Griswold-Eshleman Co. By picture and text it explains the methods claimed to have reduced cost in a dozen or more foundries and illustrates and describes the machines responsible for increase in production.

The dismantling of the old Edith furnace, Pittsburgh, of the American Steel & Wire Co., will be done by the United Iron & Metal Co., 434 Diamond Street, Pittsburgh. The cast house will be taken down and loaded for shipment to Chicago, but the wrecking company takes all of the material of the furnace, stoves and other buildings.

Production of pig iron at the Mystic Iron Works, Everett, Mass., was brought a step nearer by the arrival this week of 9200 tons of Newfoundland ore at the plant, the first consignment of raw material to be received.

University Works with Industry

Practical Research Problems, Carried Out Under Guidance of Professors, Aid Industry to Improve Product

BY ELMER F. BETH*

HOW Wisconsin metal-working industries and the University of Wisconsin are cooperating in research for the development of new ideas, principles, methods and processes in industry was described by Prof. R. S. McCaffery of the College of Engineering, at the recent meeting of the Canadian Institute of Mining and Metallurgy at Montreal. "Two years ago," said Professor McCaffery, "a group of technical graduates holding responsible positions in industry requested an opportunity to work for advanced degrees and to carry on this work in Milwaukee.

"Seven men registered for the graduate course in February, 1924, and one more came in during the next semester. The class meets on Friday evenings; on Saturday the professor visits one or two plants which have a student representative in the class. He discusses and criticizes the methods and results of the research and makes suggestions for the continuation of the projects."

What the Research Men Are Doing

Of the men who make up the class, Professor McCaffery said: "One is works manager of the Milwaukee Steel Foundry Co. and a graduate of the Carnegie Institute of Technology. As the Milwaukee Steel Foundry Co. uses basic-lined furnaces, his research project is a study of the reactions that take place in a basic-steel furnace.

"Another is vice-president of the Badger Malleable Co., South Milwaukee, and a Wisconsin graduate. He, with a third man, who is works manager of the Globe Electric Co., Milwaukee, and a graduate of Rensselaer Polytechnic Institute, are working together on a method of testing rapidly the quality of the molten metal in a malleable air furnace.

Malleable Furnace Problems

"Two other men, one from Yale and the other from Indiana, both connected with the Federal Malleable Co., West Allis, one as superintendent and the other as metallurgist, are working together on the heat balance of a malleable furnace. Another, a graduate of the Michigan College of Mines, and a metallurgist for the Glancy Malleable Corporation, Waukesha, a subsidiary of the General Motors Co., is engaged in studying the reactions of combustion in a malleable furnace for the purpose of obtaining greater accuracy of control of the quality of the finished product.

"Another, a graduate of the University of Wisconsin and a metallurgist for the Vilter Mfg. Co., Milwaukee, is studying the various factors entering into cupola-melting of semi-steel, for the purpose of determining the best conditions for controlling the quality of the product. Another, a Marquette graduate and a metallurgist for the Northwestern Malleable Co., Milwaukee, is studying the effect of silicon and manganese on the properties of malleable iron.

Practical Aspects of Research

"The projects were selected by the men themselves. Since most of them have been in industry for about ten years, they represent matured judgment as to what are some of the important research problems of their particular industries. So successful have the projects been that some of the plants have created fellowships at Wisconsin, the holders of which work at the University in collaboration with some of the graduates who compose the Milwaukee class."

A number of foundries are now cooperating in groups with the University to continue research, Professor McCaffery said. "In the Fox River Valley, 26 gray-iron foundries are forming a local organization to carry on and finance cooperative research. The plan which they propose is for a professor to visit regularly the plants in the cooperating group, to coordinate the work at Madison and at the plants, and to consult with them and advise concerning works problems and the application and use of research results. In Milwaukee a similar group of about 20 gray-iron foundries is organized to carry out a program of the same kind."

The electrical industries having also requested cooperation, a class of graduate electrical engineers was recently organized in Milwaukee. All of the research discussed by Professor McCaffery concerns basic principles and should be in the realm of educational and research institutions, he declared.

*434 Sterling Court, Madison, Wis.

TUNGSTEN AND INDUSTRY*

Notable Savings by Displacing Carbon in Incandescent Lamps

Tungsten is a material which has had a tremendous effect on modern industry. Its use as the principal alloying element in high-speed steel is well known to members of this society. Since the development of high-speed steel by Taylor and White, the mechanical arts have been literally revolutionized. It would be impossible to determine the economic value of high-speed steel.

But tungsten has another important application to which it is possible, by the use of certain assumptions, to assign a relative money value. In the present state of the electric incandescent lamp art the average efficiency during life of a tungsten filament lamp is four and one-half times that of a carbon filament lamp. Leaving out of consideration miniature lamps, there is consumed annually in the United States alone over 15 billions of kilowatt hours of electrical energy for illumination, at a cost to the consumer of approximately $800,000,000.

If the same level of illumination were maintained in the United States by the use of carbon lamps, assuming the same average cost of electrical energy to the consumer, an additional annual expenditure of about $2,900,000,000 would have to be made. Incidentally this amount of money would more than buy all of the pig iron and non-ferrous metals produced in the United States in a year. It is, of course, obvious that if we were still using carbon lamps we would not enjoy the present level of illumination. If we had, however, the present level of illumination with carbon lamps, and assuming no other material except tungsten to be available to replace carbon, we could afford to pay about $330,000 per lb. for tungsten, and still obtain our light at the same cost. The actual cost of tungsten at the present time in the ore is less than $1 per lb. This is only one illustration of the general proposition that the cost of a metal to the consumer is a function of its concentration in the earth's crust and its ease of recovery rather than of its value to industry.

*From the Robert Henry Thurston lecture delivered before the annual meeting of the American Society of Mechanical Engineers, by Dr. Zay Jeffries, metallurgical engineer Aluminum Co. of America, Cleveland.

Surpasses German Electric Practice*

German Engineer Discusses Steel Foundry Operations in United States—Reasons for Our Advantages and More Rapid Development

ALTHOUGH Germany in pre-war days stood first in the list of nations in the number of electric steel furnaces, the United States is now the leader. Before and even during the war the electric furnace was considered chiefly useful in the production of special steels; but at present in the United States its advantages have been correctly evaluated in producing the ordinary types of steel, and its use has spread less for producing special steels and increased more in steel foundries as a melting furnace.

Economic Advantages Over Germany

The economy of such a furnace installation as compared to the melting equipment ordinarily used by us in Germany is possible in the United States because:

1. The power costs in America are frequently lower than ours and the rate schedule is more properly adjusted.
2. The use of the electric furnace as the chief melting device allows for continuous melting operations and an appreciably lower current consumption.
3. The intensive utilization of the furnace by continuous operation cuts down operating costs per ton of production.

Our electric current costs are too high to permit a similar general use of the electric steel furnace in steel foundries, and consequently the melting equipment cannot be utilized so efficiently. It is considered as an auxiliary process. American foundries place a high value on rapid melting and consequently the electric equipment has been increased and the simplest furnaces of highest rating used. Neglecting certain metallurgical advantages, acid linings are used. We could improve our (German) electric furnace melting practice—we have high-grade furnaces—if we adopted the procedure described above. It would then be necessary only to attempt to decrease the prices of electric current somewhat.

Discussion

Doctor Goldbeck pointed out that the speaker's views confirmed facts known to the German steel foundries for 15 years. In the Gewerkschaft Deutscher Kaiser a Heroult furnace has been in use since 1910. Even though electric furnaces have been introduced into German foundries but slowly, nevertheless the technique in German steel works is equal or superior to American practice. Development was crippled by the war.

The advantages of American operation lie in the intensification and the scheduling of operations. Doctor Goldbeck said he had been able, by observing American methods, to increase the output enormously and cut down power consumption in the case of a Roechling-Rodenhauser electric furnace. It has not been shown to be generally desirable to increase the number of electric furnaces in Germany nor to increase the unit size greatly.

Other discussion brought out the fact that Germany's lead in electric furnace practice before the war had been terminated by the lack of or restrictions on the use of copper and aluminum during and after the war. Acid linings had been used in Germany in 1908 to 1910, but were given up, as basic linings produced just as good a steel and led to lower percentages of phosphorus and sulphur, difficult to obtain with acid linings, but demanded, nevertheless, by German consumers. There seem to be no special difficulties with acid slags. Acid linings are used in American practice, as they require a simpler operating technique, which accords with the American desire for simplification.

*From a paper presented by Prof. E. Diepschlag at a special meeting of the electric furnace section of the Association of German Foundrymen in Berlin, Jan. 16. This abstract is translated by Albert P. Sachs, technical director Universal Trade Press Syndicate, New York.

C. M. Schwab Discusses Profits

(*Concluded from page* 1447)

ing the Sheet Steel Industry Today." His talk was based on the observations of several sheet steel executives and mill men in contact with the men, as well as on his own experiences in his position with the American Rolling Mill Co. and as chairman of the labor committee of the sheet association. It was a very broad presentation of the subject and reflected that attitude on the part of steel manufacturers toward labor that has made for the present peaceful times so far as workmen are concerned. There was no attempt made to conceal that there are problems, however, and one of them is in getting the right sort of young men to engage in sheet mill work, with some other industries offering more attractive wages.

On account of the illness of C. E. Stuart, president Central Steel Co., Massillon, Ohio, a paper by him on "The Fraternity of the Business" was read by title.

New officers of the Hartford Chapter of the American Society for Steel Treating were elected at the meeting on May 11 as follows: Chairman, Raymond H. Woodward, of the Stanley P. Rockwell Co.; vice-chairman, B. A. Nemser, metallurgist, Pratt & Whitney Co., and secretary-treasurer, Henry I. Moore, salesman, Firth-Sterling Steel Co.

The number of hoists ordered in April decreased 26.75 per cent as compared with the previous month. In value the decrease was 42.7 per cent. Shipments decreased in April 33 per cent as compared with March.

Sheet & Tube Co. Finds April Earnings High

YOUNGSTOWN, May 18.—Directors of the Youngstown Sheet & Tube Co. this afternoon declared the regular quarterly dividends of $1 per share on common stock and $1.75 on preferred, payable June 30 to stock of record June 15. President James A. Campbell says earnings in April were the best of any month this year. Steel pipe business has shown improvement, but there has been a recession in other finished steel lines, and some decline in unfilled tonnage. Prices are not as strong as formerly, he adds.

The Elgin, Joliet & Eastern Railroad Co., which operates in the Chicago district and is owned by the United States Steel Corporation, is double tracking its Gary line from the main line at Griffith to the Gary terminal yards and steel plant. The double tracking program includes the widening of the elevated portions of the line near Buffington where the E. J. & E. crosses the New York Central, Baltimore & Ohio and other trunk line tracks.

A continuous furnace of the Sharon Steel Hoop Co., Sharon, Pa., will be rebuilt by the Chapman-Stein Furnace Co., Mt. Vernon, Ohio. It will be equipped with Chapman-Stein recuperators and will have an inside width of 32 ft., an effective length of 29 ft., and will have a capacity, when heating cold steel to rolling temperature, of 30 tons per hour. Producer gas will be used for fuel.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	May 12	May 13	May 14	May 15	May 17	May 18
Lake copper, New York	14.00	14.00	14.00	14.00	14.00	14.00
Electrolytic copper, N. Y.*	13.62½	13.62½	13.62½	13.62½	13.62½	13.62½
Straits, tin, spot, New York	63.75	63.00	62.75	....	62.37½	62.00
Lead, New York	7.75	7.75	7.75	7.75	7.75	7.75
Lead, St. Louis	7.50	7.50	7.50	7.50	7.50	7.50
Zinc, New York	7.07½	7.10	7.15	7.17½	7.22½	7.20
Zinc, St. Louis	6.72½	6.75	6.80	6.82½	6.87½	6.85

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, May 18.—The cessation of the British strike has given an impetus to both the copper and the tin markets, in which there has been quite heavy buying. Tin prices have receded some, but copper prices have remained almost stationary. The lead market is firm and the zinc market is a little higher.

Copper.—Two events in the past week have changed somewhat the complexion of the market. The ending of the general British strike on Wednesday, May 12, was followed here almost immediately by heavy buying of electrolytic copper, largely by consumers, and reports are that within the last week 25,000 to 30,000 tons was sold. The bulk of the purchases was made on May 12 and 13 at prices ranging from 13.87½c. to 13.95c., delivered. There was also considerable buying by Germany, England and France. Since then the market has been quiet. Some producers are asking 14c., delivered, but the metal is still available at 13.87½c. The other event was the publication of the statistics for April, which showed a decrease in stocks of refined metal of about 2500 tons with only a moderate increase in blister copper. It was a matter of comment that such heavy buying has not been followed by higher prices, but this is explained by some as due to continued large output. Lake copper is quoted at 14c., delivered.

Tin.—The market has been very active since the British strike ended. Total sales, mostly among dealers, amounted to at least 1700 tons for the week and the outstanding feature has been a decline in the price of prompt and nearby tin. Another feature has been the buying of large volumes of metal for August delivery and the maintaining of a steady price for it. Seldom if ever has as much metal been sold on the New York Metal Exchange as occurred on May 12 and 13. On the first day 275 tons, mostly for August delivery, changed hands at 58.65c. to 58.80c., and on the second day 500 tons, all August delivery, at 58.50c. to 58.75c. The offerings were general and were easily absorbed by dealers. It is stated that future shipments are cheaper here than in any other market anywhere, due largely to speculation. Today the market was quiet with spot Straits tin quoted at 62c., New York. Values in London were about £5 per ton less than a week ago, with spot standard quoted at £268 15s., future standard at £265 5s. and spot Straits at £276 15s. The Singapore price today was £271 10s. Arrivals thus far this month have been 3050 tons, with 6770 tons reported afloat.

Lead.—A good business is reported from all quarters and it is stated that independent producers are pretty well sold up for May and June shipments and are therefore making few offerings. The leading interest continues to quote 7.75c., New York, as its contract price, with quotations in the outside market at 7.50c. to 7.60c., St. Louis, or 7.75c. to 7.85c., New York.

Zinc.—There has been very little change in demand which continues light. Prices have gradually increased until today prime Western at 6.85c., St. Louis, or 7.20c., New York, is about 10 points higher than a week ago. The statistics for April show an increase in stocks of refined metal of about 5000 tons, but this did not seem to affect the market. Ore production is held well in check and the attitude of producers is one of firmness and a disinclination to force the market. Whether the

Metals from New York Warehouse

Delivered Prices per Lb.

Tin, Straits pig	63.50c. to 64.25c.
Tin bar	67.00c. to 67.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.75c.
Zinc, slab	8.00c. to 8.50c.
Lead, American pig	8.65c. to 9.65c.
Lead, bar	11.15c. to 12.15c.
Antimony, Asiatic	14.00c. to 15.00c.
Aluminum, No. 1 ingot for remelting (guaranteed over 99 per cent pure)	30.00c. to 30.50c.
Babbitt metal, commercial grade	30.00c. to 35.00c.
Solder, ½ and ½ guaranteed	41.00c.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	69.00c.
Tin, bar	71.00c.
Copper, Lake	15.00c.
Copper, electrolytic	15.00c.
Copper, casting	14.00c.
Zinc, slab	8.75c.
Lead, American pig	8.75c. to 9.25c.
Antimony, Asiatic	22.50c.
Lead, bar	11.00c.
Babbitt metal, medium grade	23.50c.
Babbitt metal, high grade	72.50c.
Solder, 50-50	41.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

Sheets—	
High brass	18⅞c. to 19⅞c.
Copper, hot rolled	22½c. to 23½c.
Copper, cold rolled, 14 oz. and heavier	24¾c. to 25¾c.
Seamless Tubes—	
Brass	23½c. to 24½c.
Copper	24¼c. to 25¼c.
Brazed Brass Tubes	26⅞c. to 27⅞c.
Brass Rods	16⅝c. to 17⅝c.

From New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets, (No. 9), casks	12.75c.
Zinc sheets, open	13.25c.

Non-Ferrous Rolled Products

Mill prices in brass, bronze and copper products are unchanged. Zinc and lead sheets were reduced about May 1, zinc sheets ½c. per lb. to 11.25c. and lead full sheets ¼c. to 11.50c. No changes have been made since.

List Prices Per Lb. f.o.b. Mill

On Copper and Brass Products, Freight Up to 75c. Per 100 Lb. Allowed on Shipments of 500 Lb. or Over.

Sheets—	
High brass	18.87½c.
Copper, hot rolled	22.50c.
Zinc	11.25c.
Lead (full sheets)	11.50c.
Seamless Tubes—	
High brass	23.50c.
Copper	24.25c.
Rods—	
High brass	16.62½c.
Naval brass	19.37½c.
Wire—	
Copper	15.75c.
High brass	19.37½c.
Copper in Rolls	21.37½c.
Brazed Brass Tubing	26.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	37.50c.
Tubes, base	48.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

	Base per Lb.
Sheets—	
High brass	18⅞c. to 19⅞c.
Copper, hot rolled	22½c.
Copper, cold rolled, 14 oz. and heavier	24¾c.
Zinc	12c.
Lead, wide	11.08c.
Seamless Tubes—	
Brass	23½c. to 25c.
Copper	24¼c. to 25¾c.
Brazed Brass Tubes	26⅞c. to 29½c.
Brass Rods	16⅝c.

present advance is a stable one remains to be seen, much depending upon the extent of a curtailment in output.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic 39c. per lb.

Antimony.—The market is decidedly weaker and Chinese metal for spot delivery is now available at 12c., New York, duty paid. June arrival is quoted at 11.50c. and June-July shipment from China at 11.25c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted as ingots at 27c. to 28c., delivered.

CHICAGO, May 18.—The prices of Lake copper and zinc are unchanged in a quiet market. Tin is off 1½c., due largely to the fact that the British strike is settled and spot stocks of tin in England are adequate for the present demand. Stocks of antimony are comparatively

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been promptly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.75c.	13.25c.
Copper, heavy and wire	11.50c.	12.50c.
Copper, light and bottoms	9.50c.	10.75c.
Brass, heavy	7.25c.	9.00c.
Brass, light	6.25c.	7.75c.
Heavy machine composition	8.75c.	10.00c.
No. 1 yellow brass turnings	8.25c.	9.00c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	6.75c.	7.25c.
Lead, tea	5.00c.	6.00c.
Zinc	4.00c.	4.75c.
Sheet aluminum	18.00c.	20.00c.
Cast aluminum	18.00c.	20.00c.

heavy and the price is lower than a week ago. The old metal market is quiet and without feature. We quote, in carload lots, Lake copper, 14.12½c.; tin, 64c.; lead, 7.65c.; zinc, 6.90c.; in less than carload lots, antimony, 14.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 8c.; lead pipe, 6.75c.; zinc, 5c.; pewter, No. 1, 37c.; tin foil, 44c.; block tin, 52c.; aluminum, 19c.; all being dealers' prices for less than carload lots.

Pipe Manufacture Shown by Motion Picture

"The Arteries of Industry," a new educational motion picture showing the manufacture of butt, lap and hammer-weld pipe has been made by the National Tube Co., Pittsburgh. As with the previous picture, "From Ore to 'National' Pipe" the new films will be made available by the company, without charge, for educational purposes.

This portrayal of the manufacture of pipe, from the mining of the ore to the final tests and inspection, is impressive as was the case of the previous film. Basic operations are the same in both films, but improvements in mill practice and better photography make the new picture even more interesting than the previous film.

In addition to the mill scenes, animated diagrams explained admirably the action, for example, of the converter, and the open-hearth furnace, and the action of the butt and lap-weld processes. The welding of large sizes of pipe by the hammer-weld process and the scale free process in the manufacture of butt-weld pipe are among the features of the film.

Nickel Steel Data Sheets

Data sheets on nickel steel are being issued by the International Nickel Co., 67 Wall Street, New York. Two have already been sent out entitled respectively "Society of Automotive Engineers Standard Specifications for Steels" and "Physical and Mechanical Properties of Nickel Steels." A binder, convenient for assembling and filing these data sheets, can be had on application to the company.

Railroad Service for Five Years

In its annual bulletin for 1925 the car service division of the American Railway Association, Washington, compares operating results for the last five years. The tabular matter is reinforced by graphic presentation of most of the facts of car loadings, surplus and shortage of cars, number of cars of different types ordered and put into service, revenue ton-miles, and a wealth of commodity statistics as shipped over the railroads. Production figures for pig iron and steel ingots, together with wholesale prices of both, are shown monthly for the period, in values and also in index numbers.

Bethlehem's New Relief Plan

Effective June 1, the Bethlehem Steel Corporation is putting into effect a relief plan covering disability and death benefits for employees or their beneficiaries. Employees are divided into three classes—those earning under $1,500 per year, those earning $1,500 to $2,500 and those earning over $2,500. Monthly contributions from these three classes are $1, $1.50 and $2 and sickness benefits, correspondingly, $10, $11 and $12 per week. Death benefits are $500, $1,000 and $1,500 respectively.

For any one disability, weekly payments may extend to a maximum of 13 weeks for those employed not over two years. This period extends gradually, with increasing tenure of employment, to 208 weeks (four years) for those employed 20 years or more. Monthly installments on death benefits may be paid to the widow, if she so elect.

Meeting of German Foundrymen

The German Foundrymen's Association will hold its 1926 convention in Berlin, June 4 to 6. The program is as follows:

The Porosity and the Physical Characteristics of Red Brass, by Reichsbahn Rat Dipl.-Ing. W. Reitmeister, Kirchmoeser.

The Qualities of High-Silicon Steel, by Dr.-Ing. E. H. Schulz, Dortmund.

The Shrinkage and Growth of Cast Iron, by Prof. Dr.-Ing. J. Piwowarski, Aachen.

Cast Iron and Foundry Operating Problems, by Foundry Director Carl Sipp, Mannheim.

On the occasion of the session on June 5 there will be a simultaneous meeting in the National Geological Institute of the main technical committee for the German foundry industry.

Explosion Hazards of Pulverized Coal

Bulletin 242 of the United States Bureau of Mines deals with the hazards of explosions from the use of pulverized coal at industrial plants. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, at 25c. The bulletin, which covers about 100 pages, was written by L. D. Tracy. Illustrations are numerous.

FABRICATED STEEL

Awards of 26,000 Tons Include 7300 Tons for Tanks—Maine Bridge to Take 8000 Tons

The largest fabricating award of the week was 7300 tons for tanks and agitators for the Roxana Petroleum Corporation. An apartment building in New York takes 2500 tons and a New York loft building calls for 2200 tons. The McClintic-Marshall Co. was low bidder on 8000 tons for a bridge at Bath, Me. Awards follow:

NEW YORK, 2500 tons, apartment, West End Avenue, to Paterson Bridge Co.

NEW YORK, 2200 tons, loft building, Seventh Avenue and Twenty-ninth Street, to McClintic-Marshall Co.

SCHENECTADY, N. Y., 1700 tons, bridge for New York Central Railroad, to American Bridge Co.

PAWTUCKET, R. I., 150 tons, plant for Lorain Mfg. Co., to a local fabricator.

PENNSYLVANIA RAILROAD, 200 tons, bridge, to American Bridge Co.

PHILADELPHIA, 550 tons, office building at Juniper and Arch Streets, to McClintic-Marshall Co.

PHILADELPHIA, 500 tons, tunnel for Pennsylvania Railroad, to McClintic-Marshall Co.

PHILADELPHIA, 1300 tons, restaurant building for Horn & Hardart Co., to Shoemaker Bridge Co.

PHILADELPHIA, 700 tons, manufacturing buildings for General Electric Co., to McClintic-Marshall Co.

ORLANDO, FLA., 500 tons, court house, to American Bridge Co.

CHICAGO, 1920 tons, 5 tanks and 7 floating roofs for Union Petroleum Co., to Chicago Bridge & Iron Works.

CHICAGO, 1000 tons, Corwith plant of Crane Co., to McClintic-Marshall Co.

EAST CHICAGO, IND., 7300 tons, tanks and agitators for Roxana Petroleum Corporation, divided between Chicago Bridge & Iron Works and Graver Tank Corporation.

TWO RIVERS, WIS., 400 tons, buildings for Hamilton Mfg. Co., to Vulcan Mfg. Co., Fond du Lac, Wis.

KENOSHA, WIS., 250 tons, Moose club house, to Lakeside Bridge & Steel Co.

WILLISTON, N. D., 1250 tons, Missouri River bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

ST. LOUIS, 175 tons, Christian Board of Publications, office building, to Mississippi Valley Structural Steel Co.

LEWISTON, IDAHO, 875 tons, intakes for Inland Power & Light Co., to Minneapolis Steel & Machinery Co.

SAN FRANCISCO, 100 tons, men's shelter on Fourth Street, to Herrick Iron Works, Oakland, Cal.

OAKLAND, 365 tons, Frick School, to Judson Mfg. Co.

BERKELEY, CAL., 200 tons, Odd Fellows Hall, to Herrick Iron Works, Oakland.

PORTLAND, ORE., 450 tons, three bridges for Oregon Highway Commission, to unnamed fabricator.

LOS ANGELES, 1550 tons, Shell Oil Co., 5 80,000-bbl. tanks, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

SOUTHERN RAILWAY, 3000 tons, bridges.

PENNSYLVANIA RAILROAD, 500 tons, bridges.

CENTRAL RAILROAD OF NEW JERSEY, 150 tons, bridge.

STATE OF NEW YORK, 150 tons, highway bridge.

NEW YORK, 1000 tons, Fordham Road improvements by city in conjunction with New York Central Railroad.

NEW YORK, 800 tons, public schools Nos. 52 and 73.

ROCKAWAY, N. Y., 400 tons, highway bridge.

BATH, ME., 8000 tons, highway bridge; McClintic-Marshall Co. low bidder.

CINCINNATI, 1200 tons, water tanks for city of Cincinnati; previously reported as 400 tons; bids in May 19.

CINCINNATI, 100 tons, chapel for Fenwick Club.

HUNTINGTON, W. VA., tonnage unknown, three steel docking caissons for Ohio River; bids received until June 12 by United States Engineer's Office.

MEMPHIS, TENN., 2000 tons, barges for United States Engineers; bids close June 1.

PORTLAND, ORE., 182 tons, two highway bridges for Oregon Highway Commission; bids May 25.

SAN FRANCISCO, 650 tons, Commercial Union Building addition, Pacific Rolling Mill, Inc., low bidder.

BERKELEY, CAL., 300 tons, Claremont Theater, Judson Mfg. Co. low bidder.

RAILROAD EQUIPMENT

Fruit Growers Express Wants 1200 Underframes —Texas Road Buys 300 Cars

A Texas road has ordered 300 automobile box cars, but otherwise there has been no railroad equipment buying of consequence. The Fruit Growers Express is inquiring for 1200 underframes and the Tennessee Central has asked for prices on 275 cars. The Central Railroad of New Jersey has reinstated an inquiry for 1000 box cars. Details follow:

The Chicago & North Western is inquiring for 20 caboose car underframes.

The Fruit Growers Express is in the market for 1200 underframes for cars.

The Central Railroad of New Jersey has reinstated an inquiry for 1000 box cars which had been withdrawn.

The Tennessee Central is inquiring for 100 hopper cars, 100 gondolas, 50 stock cars and 25 flat cars.

The Pittsburgh Terminal Coal Co. has sent out an inquiry for 800 mine cars.

The Chicago, Rock Island & Pacific has asked for bids for rebuilding 186 gondola car bodies.

The Seaboard Air Line has sent out an inquiry for 15 to 20 steel passenger coaches.

The Weatherford, Mineral Wells & North-Western has placed an order with the American Car & Foundry Co. for 300 50-ton automobile cars.

Structural Steel Sales High in April

WASHINGTON, May 18.—The Department of Commerce announces sales of fabricated structural steel for April as 71 per cent of capacity, based on total bookings of 183,134 tons reported by fabricators with a capacity of 258,280 tons per month. This compares with bookings of 68 per cent of capacity in March and 76 per cent for April, 1925.

Shipments of fabricated structural steel in April represented 80 per cent of the capacity of firms reporting this item as against 81 per cent in March and 76 per cent a year ago.

Mahoning Valley Operating at 75 Per Cent

YOUNGSTOWN, May 18.—Principal changes in operating schedules this week in the Mahoning Valley are the suspension of a blast furnace in the Ohio Works group of the Carnegie Steel Co. for relining; temporary withdrawal of two open-hearth furnaces by the Republic Iron & Steel Co.; adding of one open-hearth furnace each by the Sharon Steel Hoop Co. and the Trumbull Steel Co., and an increase in active steel pipe capacity equivalent to the operation of one mill.

Of 18 tube mills in the Mahoning Valley, the equivalent of 14½ units are rolling. Averaging 80 per cent, steel pipe output is at the highest rate in many weeks, and represents an important factor in maintaining steel-making and blast furnace operations. District producers have recently booked important steel pipe tonnage, and the outlook for this class of business is reported quite satisfactory.

Of the 68 district open-hearth furnaces, 51 are in operation, and steel ingot production, including Bessemer steel plants, is holding at 75 per cent.

Plans for stimulating the sale of oil-burner equipment to domestic and industrial users have been developed by the American Oil Burner Association, 350 Madison Avenue, New York. They are given in a pamphlet showing the advantages of oil burning, giving information about it for both types of users, and covering service methods and dealer distributers for the domestic field, and sales methods for those entering the industrial plants.

PERSONAL

John Shaw has been selected to represent the Institute of British Foundrymen in the presentation of an exchange paper before the Detroit meeting of the American Foundrymen's Association in September. Mr. Shaw has been prominently identified with foundry organization affairs for many years, having joined the institute in 1906. He was president of the Birmingham branch for three years and is now president of the Sheffield branch. He is the third eldest British member of the American Foundrymen's Association, which he joined in 1910, and represents the British foundrymen on the international committee appointed to work out standardization tests for cast iron. He is also the delegate of the institute to the British Engineering Standards Association. He was presented with the Oliver Stubbs gold medal at the 1924 meeting of the I. B. F. The subject of Mr. Shaw's Detroit paper is "Some Further Gray Iron Problems."

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C. J. Rodman has been appointed general manager of the Buckeye Jack Mfg. Co., Alliance, Ohio.

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C. P. Richter, metallurgical engineer Central Steel Co., Massillon, Ohio, will address the St. Louis chapter of the A. S. S. T. Friday evening, May 21, on "Factors Governing the Selection of an Alloy Steel."

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Bolling Jones, Jr., Atlanta, has been named president and general manager of the Atlanta Stove Works, to succeed his father, Samuel D. Jones, who becomes chairman of the board of directors. Samuel D. Jones has been active for many years in this particular line of manufacturing. He built the company up from a concern with a limited local distribution to one of the leading companies of its kind in the Southeast. Bolling Jones, Jr., has been connected with the firm for the past ten years. He is a graduate of the University of Georgia. Starting in "at the bottom" in his father's company, he gained a wide experience in both manufacturing and distribution, rising rapidly to the position of vice-president and general manager, which place he had held for a number of years prior to his selection as president. The Atlanta Stove Works was founded more than 40 years ago as the Georgia Stove & Range Co. In addition to cooking and heating stoves, it now manufactures dog irons, grates, stove hollow ware, country hollow ware and many allied products, doing business all over the South as well as a substantial export business.

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Daniel Ackerman, for 20 years with the Canton Foundry & Machine Co., Canton, Ohio, has recently taken charge of the production end of the Stark Foundry Co., Canton. E. E. Miller is president.

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Harry Coulby, of Pickands-Mather & Co., Cleveland, and chairman of the board of the United Alloy Steel Corporation, Canton, Ohio, and John C. Chandler, Cleveland sales manager Bethlehem Steel Co., will sail May 22 on a six weeks' trip to Europe.

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Homer L. Rank has resigned as sales manager Bonnot Co. and is now sales manager of the fuel pulverizing department Strong-Scott Mfg. Co. of Minneapolis.

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Fred G. Rumball, formerly manager Kansas City branch Timken Roller Bearing Service & Sales Co., has been promoted to sales engineer, automotive division, Timken Roller Bearing Co., with headquarters at Cleveland. Edgeley W. Austin is assistant manager of sales. Mr. Rumball first joined the Timken Detroit Axle Co. Later he transferred to the Timken Roller Bearing Service & Sales Co., holding positions in the Indianapolis, Minneapolis, Detroit and Kansas City branches. The position of branch manager at Kansas City will be filled by J. M. Carey, who was a salesman under Mr. Rumball.

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T. F. Rose, formerly assistant manager Chicago branch Timken Roller Bearing Service & Sales Co., has been appointed manager of the Cincinnati branch. H. C. Sauer, formerly assistant branch manager at Cleveland, becomes manager of the Detroit branch.

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Robert P. Miller, vice-president and general manager Union Iron Works, Los Angeles, and H. H. Whiting, president Best Steel Castings Co., Oakland, Cal., were elected to directorships in the California Manufacturers Association at the annual meeting of the membership committee at the Hotel Biltmore, Los Angeles, May 7. The association now numbers more than 1500 manufacturers among its members, scattered in 207 cities.

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Thomas O'Brien, who resigned some months ago as engineer and sales manager John F. Allen Co., New York, has become associated in a similar capacity with the Reliable Machine & Tool Co., 339 Canal Place, New York. He is handling a line of pneumatic compression riveters for the structural steel and allied industries.

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Donald M. Crossman has resigned as advertising manager Niles-Bement-Pond Co., 111 Broadway, New York. After 16 years' service with this company he plans to see some of the world before making a new connection. He is sailing for Europe on May 27 and expects to be back about Oct. 1.

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Richard C. Feltes has been appointed manager Hisey-Wolf Machine Co., manufacturer of portable electric drills, grinders and buffers, Cincinnati. Hisey electric tools have been manufactured since 1896. The Chicago address is 549 West Washington Boulevard. Mr. Feltes was for 12 years manager of the Chicago office United States Electrical Tool Co., Cincinnati. He is a brother of G. H. Feltes, formerly sales manager and treasurer United States Electrical Tool Co.

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R. T. Browne, Pittsburgh district sales manager Youngstown Sheet & Tube Co. for the past seven years, has resigned to become sales manager of a real estate company in Atlantic City.

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Eugene B. Files, who for several years was identified with the sales department of the Frasse Steel Works, Inc., Hartford, Conn., and who became identified with the New York office of the Union Drawn Steel Co. when the latter took over the Frasse Steel Works, Jan. 1, 1925, has been transferred to the Chicago office of the Union Drawn Steel Co.

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F. F. Fitzpatrick, president Railway Steel Spring Co., was elected president of the American Locomotive Co. at a meeting held in New York May 14. William H. Woodin is chairman of the board. A. S. Henry, G. B. Motherall and Seward Prosser, directors of the Railway Steel Spring Co., were elected directors of the American Locomotive Co.

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Elbert H. Gary, chairman United States Steel Corporation, is one of three business men elected last Thursday as honorary vice-presidents of the Chamber of Commerce of the United States. The election of Judge Gary, together with Fred I. Kent, vice-president Bankers Trust Co., New York, and Jeremiah Smith, Jr., financial administrator of Hungary, was a special tribute in recognition of their public services. Specifically, Judge Gary was given the honor for advancing the "new conception of the American business executives contributing to the common good."

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Frank Emerich, formerly director of information for the Western Association of Rolled Steel Consumers, delivered an address at the regular monthly meeting of the Purchasing Agents Association of Chicago, at Hotel Sherman, Chicago, May 13. His subject was the "Readjustment Effect of the Pittsburgh Plus Decision on Industry."

OBITUARY

GUILLIAEM AERTSEN, past-president of the American Society for Testing Materials, died in Germantown, Philadelphia, on April 20, after an illness of nearly two years. Mr. Aertsen's health failed during the closing days of his presidency of the society in 1924. Late in that year he suffered a stroke which confined him to his home, and in his weakened condition he was unable to recover from a sudden relapse a few days before his death. He was long an active member of the society's committee A-1 on steel, serving for a time as its vice-chairman. He was a member of the executive committee from 1918 to 1920, vice-president from 1921 to 1923 and president in 1923-24. He served during the difficult period occasioned by the death of Edgar Marburg in 1918 and the subsequent establishment of independent society headquarters. As chairman of the finance committee in those days he was largely responsible for the financial policy and it was principally through his efforts that the society headquarters were established at the Engineers' Club.

GUILLIAEM AERTSEN

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HERBERT W. HAYES, for more than 25 years associated with the steel industry, died suddenly in his office at 40 Court Street, Boston. He was for many years New England representative of the Midvale Steel & Ordnance Co. and the Cambria Steel Co., continuing in that position up to the time that the Midvale company was absorbed by the Bethlehem Steel Corporation. He is survived by Mrs. Hayes, one son, Harold D. Hayes, Hartford, Conn., and two sisters.

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PER THORSTEN BERG, one of Sweden's foremost engineers and a leader in the work for cooperation between America and Sweden, died in Stockholm on May 14, at the age of 73. Mr. Berg, who formerly was chief engineer of the Carnegie Steel Co., Pittsburgh, and technical representative in Europe of the United States Steel Corporation, was made United States vice-consul in Sweden in 1915.

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JOHN MULLIGAN, president Ulster Iron Works, Dover, N. J., died at Clifton Springs, N. Y., on May 5. He had been suffering from heart and kidney trouble for some 18 months. He is survived by his father, C. R. Mulligan. Born at Saugerties, N. Y., Jan. 10, 1870, he was educated in private schools in New York and later attended St. Pauls School, Concord, graduating in 1888. Immediately upon leaving school he entered the iron business. For many years he was the leading spirit of the Ulster Iron Works organization and was largely responsible for the reputation attained by Ulster products. He was well known outside of the manufacturing field, belonging to the Metropolitan Club, the Union Club, the New York Yacht Club and, immediately prior to his illness, was for several years president of the Southside Sportsmen's Club. He also served for two terms as mayor of Dover.

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WILLIAM EDENBORN, owner of the Louisiana Railway & Navigation Co., died in Shreveport, La., on May 14, after a week's illness. Mr. Edenborn was born in Westphalia, Prussia, in 1848. He came to the United States in 1867, and, after residing in Pittsburgh and Cincinnati, moved to St. Louis in 1870. With F. M. Ludlow he organized the first wire mill in that city. This was followed by other mills until, in 1899, he incorporated the American Steel & Wire Co. of New Jersey, which later was sold to the United States Steel Corporation for a consideration reported at $100,000,000. He invented a machine for manufacturing nails and barbed wire. In the wire industry Mr. Edenborn's first invention was the development of the essential features of machinery for making barbed wire. This made it possible to double the rate of production. He invented a wire rod reel which was described years ago in THE IRON AGE and which came into general use all over the world. He held the basic patents, through his invention of machinery, for making field fence.

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HENRY FLEETWOOD ALBRIGHT, vice-president Western Electric Co., died May 12 in New York, after a long illness. He was 58 years of age. His home was at 507 North Euclid Avenue, Oak Park, Ill. Mr. Albright started with the Western Electric Co. in 1892 and is credited with the building of its Hawthorne works at Cicero, Ill. He was born at Lancaster, Pa., was educated in the Philadelphia schools, and, after a few years as sales engineer for electrical concerns, became associated with the Western Electric Co. He became superintendent in 1907 of the company's manufacturing plants, with headquarters at the Hawthorne works, and in March, 1917, was elected vice-president in charge of manufacturing. In 1919 he was made a director. He was a member of the Institute of Electrical Engineers, London, of the American Society of Mechanical Engineers and a Fellow of the American Institute of Electrical Engineers. He was also a member of the Union League Club of Chicago and the Oak Park Country Club.

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CHARLES E. GILES, consulting engineer and close associate of the late George H. Corliss, inventor of the Corliss steam engine, died at his home in Providence, May 9, after an illness of ten days. He was 82 years old. Mr. Giles was recognized as an authority on steam engineering. He was a member of the American Society of Mechanical Engineers since 1891 and was a veteran of the Civil War.

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GODFREY STENGEL, JR., aged 59, president Pittsburgh Tool Steel Wire Co., died May 17 at his home in Pittsburgh. Mr. Stengel founded the Pittsburgh Tool Steel Wire Co. in 1902, and was active in establishing it as one of the leading independent producers of cold-drawn fine steels in the United States. He was a member of the American Society for Steel Treating.

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NORMAN STANLEY LEWIS, secretary National Malleable & Steel Castings Co., Cleveland, died May 14, aged 62 years. He had been in poor health for several years. Mr. Lewis had been connected with that company for 35 years, starting as a bookkeeper at the Toledo plant. He served as treasurer of the Sharon plant and later was transferred to Cleveland as assistant secretary-treasurer of the company. On the death of the late O. K. Brooks he became secretary-treasurer.

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MORRIS U. BURNHAM, president Alvey-Ferguson Co., Cincinnati, manufacturer of conveying machinery, died at his home in that city on May 8. He had been associated with the company for the past 20 years.

In automobile production, only two of the large makers are operating at materially lower rates than were anticipated for the season, according to *Automotive Industries*. Though it is doubtful whether retail demand in all cases thoroughly justifies the heavy production or insures its continuance, dealer stocks are reported only normal.

British Operations Resumed Slowly

Coal Shortage Serious—Export Competition Weakens Continental Prices—American Mills Book Foreign Bar and Plate Orders

(*By Cable*)

LONDON, ENGLAND, May 17.

THE general business situation is improving slowly, but the pre-strike level of pig iron output is not likely to be reached until the end of the month. Fuel is still the crux of the situation. Demand for pig iron is slow, but is expected to improve shortly. Foreign ore is stagnant, with Bilbao Rubio prices nominal.

Finished steel is quiet, some makers resuming gradually, but engaging only a minimum staff, and others unable to operate as a result of the shortage of fuel.

The tin plate market is quiet with several makers restarting their finishing departments today, but general production not yet resumed. There is some small demand for forward shipment. Galvanized sheets are dull. Some works have reopened, while others are unable to resume because of coal shortage. Prices are firm. Black sheets are quiet.

Continental markets have been disorganized by the British depression and business is confined to limited buying. Continental, excluding German, reports confirm the existence of the European Rail Makers Association and the following percentage quotas are given: Belgian and Luxemburg mills, 17 per cent; French and German mills, 39.75 per cent; British mills, 43.25 per cent. The British quota unofficially includes American participation. Prices are maintained at £5 17s. 6d. for export to European consumers and £6 to other foreign markets. Belgian and Luxemburg wire rod makers are endeavoring to form a cartel. The German Raw Steel Association now includes the Acieries Reunies de Burbach-Eich-Dudelange and the Rothe Erde Werke (Societé Metallurgique des Terres Rouges) in Luxemburg.

FRENCH EXPORT PRICES WEAK

Domestic Market Fairly Well Maintained but German and Belgian Competition Proves Severe

PARIS, FRANCE, May 7.—The depreciated franc continues to exercise an adverse effect on business. The iron and steel markets, as a whole, show little or no change in the past fortnight, continuing quiet and depressed. Much of the current quietness may be attributed to the increases in quotations, caused by higher costs of production. Keen competition for export business is causing weakness in prices of material for shipment abroad and this condition is made worse by the rapid fluctuations of exchange. The price on German indemnity coke is 171 fr. per ton, f.o.b. Sierck, for May, but the price for June, based on the rise in value of the gold mark to 7.50 fr. is to be increased by 21 or 24 fr. per ton to 192 or 195 fr. As a result the demand for indemnity coke has declined from 306,000 tons in May to about 230,000 tons for June. The deficit is expected to be made up by imports of Belgian and British coke.

Pig Iron.—Production is still increasing, but the domestic and export markets are thus far easily absorbing the larger tonnage that is available. Prices are firm and the market as a whole in a satisfactory position. The coke situation, however, is something of a menace to this stability for the increase in price for June, when reflected in the price of pig iron, may exercise an adverse effect on business. The association of French, Belgian and Luxemburg producers of phosphoric pig iron is successfully maintaining the market at a profitable level. The recent price of 400 fr. per ton, Brussels, quoted by Belgian furnaces, has been increased to 425 fr. ($12.92), reflecting the decline in value of the Belgian franc, which is now below the French franc. The export price has been advanced 2s. per ton from 65s. ($15.80) to 67s. ($16.28), f.o.b. Antwerp, the price being based on the silicon content. The actual price, however, is apparently still about 60 to 62s. ($14.58 to $15.06) per ton, f.o.b. Antwerp.

Semi-Finished Material.—Available supplies are small and prices quite firm for domestic delivery. While this scarcity of supplies is applicable to the export market, the price situation is less satisfactory in the face of keen competition from Belgian and German mills. The greater activity of the domestic market is

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd..	£0	18½s.				$4.50		
Bilbao Rubio ore†...	1	1	to	£1	1¼s.	5.16	to	$5.19
Cleveland No. 1 fdy..	3	12½	and	3	13*	17.62	and	17.74*
Cleveland No. 3 fdy..	3	10	and	3	10½*	17.01	and	17.13*
Cleveland No. 4 fdy..	3	9	and	3	9½*	16.77	and	16.88*
Cleveland No. 4 forge	3	8	and	3	8½*	16.52	and	16.65*
Cleveland basic	3	10	and	3	10½*	17.01	and	17.13*
East Coast mixed....	3	16½	to	3	17	18.59	to	18.71
East Coast hematite..	3	16	to	3	16½	18.46	to	18.58
Ferromanganese	15	0				72.90		
*Ferromanganese ...	14	0				68.04		
Rails, 60 lb. and up..	6	15	to	7	5	32.80	to	35.24
Billets	6	0	to	7	10	29.16	to	36.45
Sheet and tin plate bars, Welsh	6	5				30.38		
Tin plates, base box..	0	19¼	to	0	19½	4.68	to	4.73
Black sheets, Japanese specifications	13	10	to	14	0	65.60	to	68.04
						C. per Lb.		
Ship plates	7	0	to	7	10	1.52	to	1.62
Boiler plates	9	0	to	11	0	1.95	to	2.39
Tees	7	5	to	7	15	1.57	to	1.68
Channels	6	10	to	7	0	1.41	to	1.51
Beams	6	5	to	6	15	1.35	to	1.46
Round bars, ¾ to 3 in.	7	12½	to	8	2½	1.65	to	1.77
Steel hoops	10	10	and	11	0*	2.28	and	2.39*
Black sheets, 24 gage	10	15	to	11	0	2.33	to	2.39
Galv. sheets, 24 gage.	15	10	to	15	15	3.36	to	3.41
Cold rolled steel strip, 20 gage	18	0				3.91		

*Export price.
†Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron: (a)								
Belgium	£3	7s.				$16.28		
France	3	7				16.28		
Luxemburg	3	7				16.28		
Basic pig iron: (a)								
Belgium	2	18				14.09		
France	2	18				14.09		
Luxemburg	2	18				14.09		
Coke	0	18				4.37		
Billets:								
Belgium	4	5	to	£4	7s.	20.65	to	$21.14
France	4	5	to	4	7	20.65	to	21.14
Merchant bars:						C. per Lb.		
Belgium	4	16	to	5	0	1.05	to	1.08
Luxemburg	4	16	to	5	0	1.05	to	1.08
France	4	16	to	5	0	1.05	to	1.08
Joists (beams):								
Belgium	4	14	to	4	15	1.03	to	1.04
Luxemburg	4	14	to	4	15	1.03	to	1.04
France	4	14	to	4	15	1.03	to	1.04
Angles:								
Belgium	5	2	to	5	4	1.12	to	1.15
¼-in. plates:								
Belgium	5	17	to	6	1	1.29	to	1.33
Germany	5	17	to	6	1	1.29	to	1.33
⅜-in. ship plates:								
Belgium	5	7	to	5	9	1.18	to	1.20
Luxemburg	5	7	to	5	9	1.18	to	1.20
Sheets, heavy:								
Belgium	6	3	to	6	4	1.35	to	1.37
Germany	6	3	to	6	4	1.35	to	1.37

(a) Nominal.

proving of some assistance, however, in maintaining prices. Prices for export are still unchanged at about £3 19s. ($19.20) per ton for blooms, £4 6s. ($20.90) per ton for billets and £4 9s. ($21.63) per ton for slabs, all f.o.b. Antwerp.

Finished Material.—Mills are achieving a more satisfactory position and deliveries are extended from six weeks to two months on certain of the small sizes of beams. The export market on beams, however, continues weak at £4 12s. 6d. to £4 13s. 6d. ($22.48 to $22.73) per metric ton, f.o.b. Antwerp. Bars are showing some weakness for export and Lorraine mills have recently accepted as low as £4 15s. ($23.08) per metric ton, Antwerp, on mild steel bars. This is in sharp contrast to a fairly firm domestic market. Hoops are being maintained at 900 to 920 fr. ($27.45 to $28.06) per metric ton by mills in the North, but a Saar maker is reported to be continuing to offer as low as 890 fr. ($27.15) on 3 mm. hoops.

Sheets.—In this market, also, the domestic price is fairly firm and business shows an improvement while the export market, affected by keen competition from other European steel producing countries, shows weakness. Prices for export have declined to £5 to £5 1s. ($24.30 to $24.54) per ton for the heavy gages and £5 10s. ($26.73) per ton for medium gage.

LUXEMBURG PRICES SOFT

Franc Decline and Keen Competition with Belgium, France and Germany Depress Market

LUXEMBURG, April 28.—Until the middle of March the iron and steel business of Luxemburg was in a particularly favorable position; prices exhibited a slight tendency to rise and export trade was stimulated by the prospect of international "ententes" being formed. Since then, however, the decline of the Belgian franc in international exchange has exercised an opposite effect on the market. As a result of this situation, Luxemburg mills have been endeavoring by keen competition and drastic reduction of prices to secure much needed business on the basis of more stable currencies. While a slight increase in domestic prices has been successfully made, it is not proportionate to the decline in value of the franc, and even though larger, would affect the mills but little, as the consumption of Luxemburg is so small.

In the meantime, French mills have been actively competing for export business with greatly depreciated currency and the Belgian mills in the Charleroi district, still in need of orders, have been active in seeking new business. Not only is this providing strong competition but the cost of raw materials for the Luxemburg makers has increased as a result of the franc depreciation.

Pig iron for export continues quite firm as a result of the association of French, Belgian and Luxemburg producers. Phosphoric foundry iron is quoted at 395 to 400 fr. per metric ton, f.o.b. Antwerp. Despite the scarcity of semi-finished material, prices have receded, although in the past fortnight this market is holding rather steadily. Blooms are quoted at £3 19s. ($19.20) per ton, billets £4 6s. to £4 6s. 6d. ($20.90 to $21) and slabs £4 9s. to £4 9s. 6d. ($21.63 to $21.75), all f.o.b. Antwerp.

International competition is particularly keen on finished steel business. Although French mills show an increasing inclination to offer important concessions in price, Luxemburg makers are holding fairly well to their quotations. The current price of £4 18s. 6d. ($23.94) per ton, f.o.b. Antwerp, for bars, could probably be shaded and £4 14s. ($22.85) per ton for beams is probably not the minimum price at which desirable orders could be placed. Wire rods continue fairly firm at £5 10s. ($26.73) per ton, f.o.b. Antwerp.

In March the total production of pig iron was 212,729 tons with 38 furnaces in blast on March 31. Ingot production reached a total of 195,784 metric tons.

AMERICAN EXPORT PRICES LOW

European Mills Underquote on Plates and Bars —German Cotton Ties Sold Here—Japan Inquires for Rails

NEW YORK, May 18.—Importers of steel in the United States have been quite active lately in submitting bids on the steel included in some of the large construction projects under consideration in the United States, Canada, Cuba and South America. On most of these contracts mills in the United States have been keen competitors and in several instances sufficiently low in their bids to book the business.

On a recent inquiry from Hamilton, Ont., for about 5000 tons of plates, competition between a large mill in the United States and one of the largest German works resulted in a price of about 1.90c. per lb., c.i.f. Hamilton, duty paid, the American quotation, compared with about 1.93c. per lb. or more, the German price. Through inability to ship direct to Hamilton, the German seller quoted 1.48c. per lb., Montreal, to which must be added the duty and transportation to Hamilton.

It is reported that on the reinforcing bars for Maracaibo, Venezuela, where the Raymond Concrete Pile Co., New York, is to build a sea wall and driveway, at least part of the total of about 1500 tons will probably go to the leading interest at a price said to be between 1.55c. and 1.60c. per lb., c.i.f. Maracaibo. The question of prompt delivery is said to have entered into the final negotiations.

Neither American contractors nor American mills were as successful in securing the contract and material for the Malacon driveway and seawall at Havana, Cuba. The general contractor, Arellano & Mendoza, Havana, is reported to have purchased the steel, 3320 tons of reinforcing bars and about 300 tons of beams from a Havana warehouse handling Belgian steel, Celestino Joarasti & Co. It is understood that 500 tons of the material required was immediately available from warehouse stock.

Slight delay is understood to have occurred on the project of a viaduct at Key West, Fla., which will involve the purchase of about 11,000 tons of reinforcing bars. C. A. P. Turner, consulting engineer and contractor, Minneapolis, Minn., is in charge of the project.

An active business in small tonnages of steel continues to be reported by importers of the European product. One importer in New York recently closed on about 500 tons of plain steel bars in the Boston district. There has been some moderate activity by agents of European mills, particularly German, in the sale of cotton ties in the South and Southwest. One importer recently sold a total of 1000 tons of ties, about 50,000 bundles for delivery, c.i.f. Galveston. The price, in the absence of an accepted domestic schedule for this season, is reported to have been about $1.20 per bundle, c.i.f. duty paid, with the buyer protected against lower domestic price when the market is established.

Japanese business is still quiet except for the large inquiries such as rail tonnages. A few purchases that have been pending for some time have been made recently. The Toho Gas Co., Nagoya, has awarded 369,000 ft. of ⅜ to 2½-in. galvanized gas pipe to the New York branch of a Japanese export house, the pipe to be furnished by a large American maker. The Imperial Government Railways has also purchased a small tonnage of gas pipe in the United States. This railroad is understood to have closed also on about 300 tons of "Armco" sheets through a Japanese export

house. Tokio municipality opened bids May 17 on six miles of girder and grooved rails and the South Manchuria Railway Co. will open bids May 20 on 70 miles of 65-lb. sections, about 7150 tons.

German Mills Compete with Norway and Sweden for Chinese Nail Business

LÜBECK, GERMANY, May 6.—German mills are active in seeking business in the Far East. Until recently China and India were active buyers of boat nails with rose heads in Sweden and Norway, the two most popular brands being double S and Crown, manufactured by the Spigerwerk Oslo and the Mustad Goteborg. Prices were considered rather high, ranging from 20s. to 26s. per 100 lb., f.o.b., for the 2 to 10-in. sizes packed in double gunny sacks. Recently German manufacturers of nails have entered into competition with Sweden and Norway for this business, and as a result the price has declined to as low as 17s. to 20s. per 100 lb., f.o.b.

German mills are also absorbing most of the business with China in bamboo steel with Austrian makers also active competitors. The mills claim that this is a result of recent improvements in the quality and better packing. Well known brands, such as Three Crowns, Sword, Double Lamb and King, are quoted at £14 15s. to £15 5s. per ton, f.o.b. Hamburg, for ⅝-in. and ¾-in. square. Austrian makers quote £15 15s. to £16 per ton, f.o.b. Trieste, the freight rate to Shanghai being 15s. per ton less than from Hamburg.

Czechoslovakian, Austrian manufacturers and the German Wire Syndicate are negotiating at Prague, Czechoslovakia, for the formation of a Central European syndicate of wire makers. Another possible international syndicate lies in the negotiations at Warsaw for the formation of an association of Polish, Czechoslovakian, Austrian and Hungarian steel mills to control the distribution of products in Russia, the Near East and Asia Minor. Such an association would establish export prices and allot quotas to the various members.

American Metal Furniture Enjoys Greater Foreign Demand

The sales of American metal furniture in all sections of the world have shown a steady increase during the past three years, and the figures for the first quarter show an 8 per cent increase over the average for 1925, according to the specialties division of the Department of Commerce. Exports of metal furniture from the United States in 1925 amounted to $4,652,603; in 1924 to $3,993,633; and in 1923 to $3,394,326. The foreign shipments during the first three months of the current year totaled $1,260,301. These figures do not include safes, safety-deposit boxes, vaults or lockers. Sales to Latin America totaled $2,531,343 in 1925. That region has been the principal destination of American metal furniture for the past three years. European countries purchased $1,064,709 worth of those products during the past year while $561,452 worth was shipped to the Far East.

Exports of implements during March continued at a high level and totaled $7,939,597 during the month, although there was a decrease of $800,000, as compared with February, according to the Agricultural Implements Division of the Department of Commerce. However, the March exports were nearly $700,000 greater than the exports in March, 1925. Shipments of implements during the first quarter of 1926 were greater than during any other first quarter, except in 1920. During the first quarter of this year they amounted to $25,122,850, which was an increase of $9,000,000 over the total for the first quarter of 1925.

The Republic Rolling Mill Corporation, with a mill at East Chicago, Ind., will start up an 8 to 10-in. mill which has been down since 1922. Steel bars and bands will be rolled from billet stock.

STEEL PLANT IN CHILE

Project Alive to Erect Hydroelectric Station and Electric Furnaces

Taking advantage of its rich iron ore deposits, Chile seems determined to become a steel-producing nation. Heretofore practically all of South America has had to depend upon either Europe or the United States for its steel supplies. Although Chile has coal, none of it has been found to produce coke of suitable blast furnace structure. The solution appears to be the development of cheap hydroelectric power in southern Chile, within easy transmission distance of a plant partially established at Corral for the smelting of iron ore. This location is on the seacoast at 40 deg. South latitude, and approximately 500 miles south of Valparaiso.

In our issue of March 19, 1925, on page 836, some figures were given as to Chilean imports of iron and steel products from the United States. The proposed plant was there described as one which would produce about 45,000 tons yearly, to displace an equal amount of similar material now being imported. Pig iron and rolled steel bars, plates, rails, beams, angles and rods, as well as castings, were included in the proposition.

An engineer of J. G. White Engineering Corporation, New York, now has prepared a report confirming the feasibility of developing low-cost electric power. Production of pig iron by electric furnaces and manufacture of steel products also are said to be feasible. Contract has been entered into between the Engineers Corporation, a subsidiary of the White organization, and the Compania Electro Siderurgica y Industrial de Valdivia. Engineering and construction of the proposed development will be proceeded with at once, according to present plans.

The hydroelectric plant will be of 35,000 hp. So far as possible the property of the old development at Corral will be utilized. Ore will be supplied under contract with the Bethlehem Chile Iron Mines Co. at Tofo, in the northern part of Chile. The distance by water between the ore dock at Cruz Grande (some 40 miles north of Coquimbo) and the smelting plant will be about 800 miles.

Life of Automobiles

The life history of automobiles has been studied by C. E. Griffin, professor of marketing at the University of Michigan, and the results are obtainable in a 42-page pamphlet issued by the school of business administration of that institution. The average life of motor vehicles generally he finds to be 7.04 years. Incidentally, the average life of Ford cars is substantially longer than that of all other cars taken together as a group.

The study brings out that the replacement demand of cars in 1926 with be 1,796,000, in 1927, 2,063,000 cars and 1928, 2,341,000. The average age of cars in use Dec. 31, 1924, was 3.07 years.

At a rate of production of 4,000,000 cars per year, and exports at 5 per cent of production, there would be in the United States in 1930 a total of 28,580,000 cars, or one car for every 4.3 persons of the estimated population of that year.

On April 1, American shipyards were building, or had under contract to build, for private ship owners, 213 steel vessels of 213,052 gross register tons, compared with 227 steel vessels of 235,464 gross tons on March 1, according to the Bureau of Navigation, Department of Commerce.

Railroad construction which will cost more than 30 million rupees is projected for the Punjab, India, during the current year, according to an announcement in the Indian press, states a report to the Department of Commerce from Assistant Trade Commissioner D. C. Bliss, Bombay.

Improving Low-Grade Iron Ore

(*Continued from page* 1409)

plemental to washing, but the present cost of 30c. to 50c. a ton is too high for the future.

Minnesota Ores and Beneficiation

"Progress in the Beneficiation of Minnesota Iron Ores" was discussed by E. W. Davis, superintendent of Mines Experiment Station, University of Minnesota, Minneapolis. He called attention to the increase in the beneficiation of Minnesota ore, but said that it is uncertain whether the proportion of ore beneficiated is going to continue to increase and that some of the beneficiating operations at present are not economically sound.

The real problem in connection with the treatment of iron ores is the removal of silica. The demand of blast furnace operators is for ore carrying 8 to 9 per cent silica, and it is becoming increasingly difficult to produce this grade of ore. While there are large tonnages of 4 to 5 per cent silica ore which can be mixed with higher silica ores to produce the required grade, these low silica properties are being rapidly depleted. The washing process has produced large quantities of low silica concentrate from ores of a non-merchantable grade, but real wash ores are also becoming scarce. None of the processes for the removal of silica that are now in operation are capable of great expansion, in the opinion of the speaker.

Coming to low-grade ores, Mr. Davis said that tremendous tonnages of high silica ore are available, but no method has been perfected by which any considerable portion of this material can be utilized. Expensive experimental and engineering work must be done before even a small commercial beneficiation plant can be put in operation. Were laboratory processes available by which low-grade ore could be brought up to a shipping grade, it would probably require five or ten years before a plant could be put in operation to economically produce 1,000,000 tons per year. In that time or less many operators would be running short of merchantable ore. The conclusion is that extensive experimental work should now be under way in connection with the utilization of the low-grade reserves.

In some cases where the silica is coarse and hard and the ore particles porous so that washing and jigging cannot be used satisfactorily, a magnetic concentration process produces satisfactory results. The ore is crushed to a 1-in. size and passed through the roasting furnace, where it is heated to a dull red and brought into contact with a reducing gas. The result is the removal of a small amount of oxygen from the iron oxide which causes it to change from hematite to magnetite. The iron oxide being in a magnetic condition may be concentrated on the drum type of dry magnetic cobber at a small cost. No furnace has been developed with a sufficiently high thermal efficiency to warrant commercial installations, but the problem is simply a mechanical one, since the amount of heat used in converting one ton of hematite to magnetite is contained in 50 lb. of coal.

By properly constructing the reducing furnace so that a higher temperature is produced and a more strongly reducing atmosphere secured, it is possible to change the ore from hematite to metallic iron. This then becomes what is called the "metallizing" or "direct reduction" process. If ore and coal are mixed in the ratio of 600 lb. of coal for every ton of iron and the resultant mixture heated at a temperature of 1000 deg. C., all the oxygen is removed and the metallized ore may then be passed over magnetic separators and a large proportion of the silica rejected. The resultant ore, sometimes called sponge iron, may then be melted down and the remaining silica slagged off.

Manganese Extraction

He called attention to another interesting undertaking under way in connection with the utilization of high silica, manganiferous ores from the Cuyuna District. The crude ore is crushed and roasted, ground to a fine size and passed through a series of leaching tanks in which the manganese oxide goes into solution. The manganese may then be precipitated out of the solution as an oxide about 99 per cent pure. The residue in the leaching tanks is then concentrated on magnetic separators, since the preliminary roasting operation has changed the iron oxide to the magnetic state. Equipment is being installed to produce manganese oxide continuously at a rate of several tons per day from ore containing about 15 per cent manganese.

Mr. Davis also spoke of work being conducted by the United States Bureau of Mines at its North Central Experiment Station in developing a method of manganese extraction from the low-silica manganese ores of the Cuyuna Range. This process consists in smelting the ore in a blast furnace so as to recover as much as possible of the manganese in the pig iron. This high manganese pig iron is then charged into a Bessemer converter in which the manganese is oxidized and removed as a high manganese slag suitable for the production of ferromanganese. The Minnesota station will also place this process in operation.

In summing up the work being done, Mr. Davis said that all these processes may turn out to be economically impossible at the present time, but with the change in conditions, more technical knowledge and better alloys and refractory materials, possibly some of this work may be of commercial value.

Experimental work that is being done with a leaching process to remove sulphur from high sulphur ore in Michigan was discussed by George G. Brown, professor of chemistry, University of Michigan. Experiments indicated that three-fourths of the sulphur can be removed, making the material merchantable ore. Professor Brown thought it feasible to pump mine water over the ore to leach it. It took 245 hr. to leach ¼-in. ore to commercial limits and 550 hr. to leach 1/3-in. ore.

Dr. Hotchkiss, chairman, closed the session with a brief discussion of the economic problems associated with the ore supply. He referred to the immense industrial development of the Central West through the use of Lake Superior ore and said that there is enough low-grade ore in the district to last for centuries, if it can be used.

Chromium Plating and Aluminum Bronze

At the Corrosion session a discussion of chromium plating by Dr. Colin G. Fink, head of the division of electrochemistry, Columbia University, attracted much interest and brought a large number of questions from the audience. Doctor Fink's paper was entitled "Electro Deposition of Chromium and Chromium Alloys on Brass and Steel." "Someone has called this the 'Chromium Age,'" he said. He referred to the increased production of ferrochromium, explained the physical and chemical properties of chromium, the effect of adding other elements and stressed the importance of its hardness. Another important feature he pointed out is its reflectivity. The reflectivity of steel and copper is 55 per cent, of nickel 63 per cent, of chromium 75 per cent and of silver 92 per cent, but chromium has an advantage over silver in that it does not tarnish. Another feature of chromium is its resistance to oxidation. Its addition to various alloys makes them resistant to oxidation at high temperature. One of its most important developments is in stainless steel.

Doctor Fink stated that chromium has already been used for plating a wide variety of products and that the advantages of chromium plating include hardness which is greater than nickel, resistance to corrosion and resistance to oxidation at high temperature. He declared that it is better than nickel for plating steel. It is being used for plating automobile parts, pipe, plumbing fixtures, rubber molds, cutlery and other products. Lithographers' plates, chromium-plated, last 20 times longer without resurfacing than those not plated. It is practical to chromium plate cast iron, as the surface is free from graphite and slag. It works well on high-speed steel and can be used for plating stamping dies. Among its present uses is the plating of dies for phonographic records. The usual thickness of the plating is 0.0002 in. Doctor Fink exhibited a number of chromium-plated articles, including ordinary

cheap spoons from which water ran off like oil, conveying the impression that the spoons were greasy.

"Special Aluminum Bronzes for Acid Resistance" was the subject of a paper by W. M. Corse, Duriron Co., Dayton, Ohio, who referred to the development of "Alcumite," a copper base aluminum alloy, an outstanding feature of which is its resistance to corrosion. He stated that the metal can be fabricated about the same as steel. In casting this metal the accepted aluminum practice is followed. It is machined about the same as steel and is forgeable but in forging it requires a different practice from steel. It can be welded and also drawn into wire. It can be used for making exhaust ducts for handling gases, crates and baskets for pickling tanks, tie rods, bolts and other parts for pickling tanks, pump parts, valves, scoops and shovels for handling acids and for machine parts subject to wear such as gears. The speaker pointed out that there is a large field for this alloy where a metal is required that will resist corrosion. One of its uses is for tips for telephone plugs.

Welding

A paper on the "Welding of Large Chemical Equipment" was presented by A. O. Miller of Reeves Brothers Co., Alliance, Ohio, at the welding and dust session. This described the shop practices at the Reeves plant in welding two large rotary kilns and in welding pressure tanks.

G. A. Carter, Linde Air Products Co., in the discussion, said that thousands of iron castings are being welded daily and that probably 100 locomotive cylinder castings are being welded every week, a bronze filler being used in welding the latter. He also stated that 36 welders are employed on engine castings in the River Rouge plant of the Ford Motor Co. His company had welded material as light as 22 gage. Mr. Miller stated that the Reeves company had welded a large number of pans for use in the rubber industry from 14-gage without the use of a welding rod and had welded plate up to 1½ in. in thickness.

The Exhibition

The exhibit which was held in the Public Hall included considerable machinery used in the chemical industry. Among the exhibits were gas welding and cutting apparatus, arc welders, steel and other metals, valves, pumps, speed reducing gears, pipe, electric measuring instruments, and equipment for grinding, crushing and pulverizing chemicals.

NEW TRADE PUBLICATIONS

Hardness Testing.—The Shore Instrument & Mfg. Co., Jamaica, N. Y. Bulletin No. 22 describing a new improvement in scleroscope hardness indicators. The bulletin is illustrated.

Pumps.—The Viking Pump Co., Cedar Falls, Iowa. A 32-page catalog with cover, illustrating and describing various types of Viking pumps, covering practically all uses. The catalog contains data on how to determine the power required for pumping; also other useful information regarding pumps and pumping.

Resistance Thermometers.—The Brown Instrument Co., Philadelphia. Catalog No. 92, 20 pages and cover, in actual colors describes the complete newly designed line of Brown resistance thermometers, picturing and describing in detail the new Brown continuous recording resistance thermometers, including prices.

Traffic Spots.—The Bridgeport Brass Co., Bridgeport, Conn. A 4-page illustrated circular showing how traffic spots made by this company can be utilized not only for highways, but also in and around industrial plants. The traffic spots made by this company are brass cups made in two diameters: 3 in. for pedestrian lanes and markings and 4½ in. for traffic divisional lines.

Internal Combustion Engines.—The Climax Engineering Co., Clinton, Iowa. A series of bulletins covering the various models of engines made by this company. These bulletins give full specifications and information concerning each model, halftones and line drawings being used to illustrate.

Forgings.—The Kropp Forge Co., Chicago. A 47-page booklet describing the methods and products of this company, which include light and heavy forgings. In addition to its forge shop, the plant has a machine shop which is equipped to do such finishing work on forgings as may be required.

Thermoelectric Pyrometers.—The Brown Instrument Co., Philadelphia. An 80-page book with an attractive cover, including 90 illustrations, completely discusses: (1) Theory of thermoelectric pyrometry, (2) installing pyrometers, (3) instruments installed ready for use—indicators, (4) instruments installed ready for use—continuous recorders, and (5) checking pyrometer installations. The title of the pamphlet is similar to that issued two years ago but the subject matter has been completely revised and the instruments now cover the new Brown line of continuous recorders brought out during the past 15 months.

Paints.—The Goheen Corporation, Newark, N. J. Bulletin No. 103, 25 pages in colors, giving specifications for the use of paint, particularly as applied to metal. A chapter on the preservation of iron and steel is included and the booklet contains color cards and considerable other information of value to those painting metal or other surfaces.

Jacks.—The Duff Mfg. Co., Pittsburgh. Folder describing the new line of Duff self-lowering jacks. These jacks are provided with governor control which prevents sudden dropping of the load.

Blowers.—The Connersville Blower Co., Connersville, Ind. Bulletin No. 21, describing the Victor rotary positive blowers which are applicable to many metalworking devices, including annealing furnaces, Babbitt melting furnaces, enameling ovens, japanning ovens, smelting furnaces, core ovens, etc.

Excavators, Dredges and Buckets.—The Hayward Co., New York. Two bulletins, one devoted to Hayward skid excavators and dredges and the other to the general line of Hayward buckets. Both are well illustrated, the pictures showing the various uses to which this equipment is being put.

Bearings.—The Bearings Co. of America, Lancaster, Pa. A 25-page, pocket-size booklet giving a revised set of data sheets showing the various sizes of ball retainers manufactured by this company for cup and cone, thrust, and open side radial type bearings. The company also manufactures thrust ball bearings, angular contact radial bearings and angular contact thrust bearings of both standard and special designs.

Pumps.—The Blakeslee Mfg. Co., DuQuoin, Ill. A 25-page illustrated booklet of pocket size describing the Blakeslee jet pump. The booklet gives various data regarding these pumps and also contains list prices.

Automatic Voltage Regulators.—The General Electric Co., Schenectady, N. Y. Bulletin No. GEA-123. Illustrating and describing the complete line of regulators manufactured by this company for every voltage requirement. The bulletin is divided into two sections, section one dealing with voltage regulators for alternating current generators, protective relays, voltage regulators for direct current generators, and speed regulators for direct current motors. Section two is devoted to induction voltage regulators for station operation and induction voltage regulators for outdoor installation.

Trucks.—The Chase Foundry & Mfg. Co., Columbus, Ohio. Illustrations on specifications covering the complete line of trucks for all purposes manufactured by this company.

Tractors, Trucks, Hoists, Etc.—The Lansing Co., Lansing, Mich. General catalog of 164 pages and cover, showing the complete line of products of this company, which include hand carts, trucks, foundry wagons; also hoists, electric tractors, concrete mixers, fence machines, etc.

Pyrometers.—The Brown Instrument Co., Philadelphia. The new pyrometer catalog No. 15 contains the latest information covering the most recent developments of pyrometry. Among these are the Brown new design recorders, single, duplex and multiple; new moisture-proof rotary switch; new champion sillimanite thermocouple protecting tubes, and a complete description with illustrations of Brown pyrometers of all types. It contains 80 pages with an attractive cover and 120 illustrations.

Manufacturing Efficiency in the United States

Productivity of manufacturing in the United States is estimated by the National Industrial Conference Board, New York, at 33 per cent more per wage earner than in 1914. The volume of production requires 25 per cent less labor, 13 per cent less power and 17 per cent less management personnel per unit of production, together with 7 per cent less actual working time per man.

As a result, "Whereas formerly American industrialists were wont to visit Europe to study manufacturing methods there, European industrialists now flock to the United States in increasing numbers to study American production methods."

Meanwhile, our exports of manufactured goods have increased from $654,000,000 average per year in 1910-1914 to $1,843,000,000 in 1925.

Explanation of our increased industrial productivity is to be found in greater application of power, more intensive mechanization and increased managerial efficiency. One-sixth more primary installed power per worker is available in American factories than 10 years ago. In spite of these efficiencies, however, wages paid, for an equal amount of production, were 2 per cent higher in 1923 than in 1914, even though a smaller amount of labor was required per unit of production. The cost of management, on the other hand, decreased 12 per cent per unit of production.

Production of Electric Power in 1925

Electric power sent out by public utility power plants in the United States in 1925 aggregated 65,870,306,000 kwhr. Of this amount 66.1 per cent was generated by the use of fuel and 33.9 per cent by water power. In the Rocky Mountain and Pacific States more than 83 per cent of all the power was generated by water. The same is true of the three northern New England States, while in Minnesota, Iowa, South Carolina, Georgia and Tennessee more than half the power was from hydraulic plants.

The output in 1925 showed a gain of more than 11.6 per cent over the highest of the previous years, 1924 having provided 59,014,000,000 kwhr. The average month in 1925 provided a greater production of electric power than did the highest month in any preceding year.

Good Business in Industrial Electric Locomotives

Shipments during the first quarter, of mining and industrial electric locomotives, aggregated 184 units, valued at $830,927, according to a report of the Department of Commerce. This is a considerable drop from the 244 units, valued at $1,245,527, in the fourth quarter of 1925, but is well ahead of the first quarter of that year, which showed 159 units, valued at $699,124.

Total shipments for 1925 aggregated 744 units, valued at $3,592,368. This was about 10 per cent ahead of 1924, with 663 units and a valuation of $3,258,643. It was far below the total of 1923, however, which showed 1355 units, valued at $5,821,454.

Nickel in 1925

Some interesting figures have lately been made public concerning the nickel industry. Due to the development of new uses of nickel and the enlargement of old ones, the production has been advanced to about 60 per cent above that of pre-war times, says vice-consul George E. Sultzer, North Bay, Ontario, Canada, in a communication to the Department of Commerce of the United States. The production of nickel ore in Canada last year was reported as 1,264,000 tons. In 1913 the output was 784,000 tons which increased to 1,643,000 tons in 1918 with the peak reached early in 1919. Due to the close of the war and other causes, particularly the Washington conference on naval armament, the decline in output after the war continued until toward the close of 1922 when it fell to only 259,000 tons. Since then the output has gradually increased and the prospect now is for further expansion. Sales at the close of 1925 are said to have been the highest since the war time peak.

Small Iron Ore Shipments in April

Iron ore shipments from the Lake Superior region in April were the smallest in many years. Ore was sent out from only one port of the six which usually make arrangements. Last month the Great Northern dock at Superior shipped 9664 tons, which constituted the total April shipments. A year ago shipments from all the ports was 2,120,670 tons.

Wholesale Prices Continue Dropping

Commodity prices reported by the United States Bureau of Labor Statistics stood in April at 151.1, compared with 100 in 1913. There was a fractional drop from the March level of 151.5, while the figure was well below that of a year ago, when it stood at 156.2. There has been a steady decline since a peak of 160.4 was reached last August.

Metals and metal products at 126.5 continued to hold low position among the general groups, having dropped from 127.7 a month ago. The miscellaneous item has dropped to an equality with the metal item, while chemicals and drugs stand only 3 per cent above these two. All other groups, with the exception of farm products, are above the average, clothing materials, fuels and building materials all being above 173. Farm products and foods are the only major groups which showed an increase during the month.

Sheet and Tin Mill Wages Up

The bi-monthly examination of sales records of sheet and tin plate mills subscribing to the agreement with the Amalgamated Association of Iron, Steel and Tin Workers disclosed an average sales price of 3.25c. per lb. for Nos. 26, 27 and 28 black sheets for the March-April period, as compared with 3.20c. in the January-February period. The wages of mill crews for the May-June period accordingly are advanced 1½ per cent to 33 per cent above base. At the examination held at Warren, Ohio, May 12, J. W. Hughes, Trumbull Steel Co., represented the manufacturers and M. F. Tighe, president Amalgamated Association, acted for the union.

Heavy Stoker Sales in April

April sales of mechanical stokers as reported by the Department of Commerce were the greatest in more than a year and, with one exception, the greatest since August, 1923. The total was 70,055 hp. in 145 units, compared with 52,312 hp. in March and with 47,627 hp. in April last year. March last year, with 71,099 hp., is the only recent month of heavier sales than last month.

Natural gas consumption in the United States in 1924 amounted to 1,141,482,000,000 cu. ft., with an estimated value at the wells of $105,779,000 and at points of consumption of $253,830,000. The consumption, according to the United States Bureau of Mines, was 13 per cent above the previous high record—that of 1923—and was more than double that of 1912.

Factory wages in New York State are represented by earnings of $29.03 per week during March. Except for the $29.05 of December and January, this is the highest figure ever recorded. The average throughout 1925 was $28.26, or slightly higher than the average of 1920, which showed $28.15 per week. The increase of March over February was 42c., or about 1½ per cent.

Trade Changes

Joseph W. Hays Corporation, Michigan City, Ind., manufacturer of draft gages, flue gas analyzers, CO_2 recorders and other combustion instruments, announces a change in name to Hays Corporation. Joseph W. Hays, who founded the business in 1907, has disposed of his entire holdings in the company, to devote his time to practice as consulting engineer. Philip T. Sprague, the new president, has been closely associated with the business for a number of years as vice-president and general manager. Headquarters of the consulting organization will be in Orpheum Building, Tulsa, Okla., where Mr. Hays has been since last June. His associate engineers are located in Philadelphia, Niagara Falls, Pittsburgh, Chicago, Omaha, St. Paul, Parsons, Kan., Salt Lake City and Los Angeles.

The industrial relations staff of Curtis, Fosdick & Belknap, 61 Broadway, New York, has removed to 165 Broadway and has taken the name of Industrial Relations Counselors, Inc. This organization, under the direction of Arthur H. Young, will continue the research and counseling service on matters of personnel administration heretofore conducted as a department of Curtis, Fosdick & Belknap.

The St. Louis district office of the Bethlehem Steel Co. has been removed from 920 Chemical Building to 1824 Arcade Building. William Chapman is manager of the office.

Henry Eggelhof, Box 945, Dallas, Tex., has been appointed exclusive representative for the Eastern half of Texas by the Uehling Instrument Co., Paterson, N. J., manufacturer of CO_2 recorders and other power plant instruments.

The branch office of the Timken Roller Bearing Service & Sales Co., located at 1033 Cathedral Street, Baltimore, was closed May 1. The service requirements of Timken customers in this territory will be supplied through the Richmond, Pittsburgh and Philadelphia branches.

Anylite Electric Co., Fort Wayne, Ind., has secured distribution for Fort Wayne and surrounding territory of the Majestic Super-B and Majestic Standard B eliminators for radio use manufactured by the Grigsby-Gruno-Hines Co., Chicago. These eliminators will be sold through the retail trade served by Fort Wayne as jobbing center. The Anylite company has secured also similar distribution of the Hipco line of B batteries manufactured by the Hipwell Mfg. Co., Pittsburgh. These will be sold to the retail trade in the territory supplied by Fort Wayne as jobbing center and also handled in some additional territory in Indiana and Illinois.

The Acme Electric Welder Co., 5617 Pacific Boulevard, Los Angeles, has changed its address to 5617 Pacific Boulevard, Huntington Park, Cal.

The Cap Screw & Nut Co. of America, 290 Hudson Street, New York, will open a branch warehouse and office at 15 Kirk Place, Newark, N. J., about June 1. This concern is the Eastern representative of the Hill Products Corporation, Chicago, and the Superior Screw & Bolt Mfg. Co., Cleveland. It will carry a complete stock of the products of the above companies at the New Jersey warehouse, as it is now doing at the New York warehouse.

Industrial Finance

Receipts in 1925 of the trustees of the Great Northern Iron Ore Properties are reported at $2,713,436, of which $2,705,000 came from proprietary companies and the remainder from interest and rental. Salaries and expenses of administration of the trust amounted to $87,316, and distributions to certificate holders aggregated $2,625,000, leaving an excess of receipts over disbursements of $1,119. Total undistributed receipts aggregate $195,682. Total distributions to certificate holders since Dec. 7, 1906, have aggregated $56,250,000, in 32 semi-annual distributions. The balance sheet shows assets of $49,998,083, of which $44,344,943 represents mineral and other lands and leases. Total surplus account aggregates $45,645,753.

The Wellman-Seaver-Morgan Co., Cleveland, has completed plans for changing its capital structure. The preferred stock will be reduced from $3,000,000 to $2,000,000, of which $1,567,200 will be outstanding. The common stock will be changed from $100 par to a new par basis and a declared valuation of $129,353 has been placed on the 25,870 shares outstanding. Old stock is to be exchanged on a share for share basis.

The Black & Decker Mfg. Co., Towson, Md., is calling for payment June 1, all outstanding first mortgage bonds remaining from the bond issue of Dec. 1, 1920, payable in 10 years. In 1925 about 20,000 sq. ft. of additional factory space was added to the Towson plant and a modern fireproof administration building erected. Branch offices have been opened in various parts of this country and Canada until the total now is 16. Early in 1926 the company purchased the properties and patents of the Marschke Mfg. Co., Indianapolis, manufacturer of heavy-duty grinders and buffers and is operating this grinder division at the factory location of the former company. Within the last 30 days 30,000 sq. ft. of property has been purchased in Oakland, Cal., and contract let for the erection of a fireproof building to be used as Pacific Coast sales headquarters, service and warehousing.

Earnings of the Elgin, Joliet & Eastern Railway, controlled by the United States Steel Corporation, showed a substantial increase in 1925 over the preceding year. Net income after all charges amounted to $1,311,527, or $13.11 a share on the $10,000,000 capital stock, as compared with $538,483 or $5.38 a share in 1924.

Net earnings for the first three months of the Trumbull Steel Co., Warren, Ohio, which was financially reorganized during the latter half of last year, were $553,520 after all charges other than allowance for Federal taxes. This is equivalent to 3.163 times the preferred dividend for the period and, after allowing for that payment, to 65.9c. per share on the 574,108 shares of common stock. The earnings statement shows income after expenses of $1,080,186. Depreciation of $210,000 left $870,186, reduced by interest, amortization and bond discount to $553,520. The balance sheet shows current assets of $10,549,596, and current liabilities of $2,271,706, leaving working capital of $8,277,890. Investments in other companies, carried Dec. 31 last at $2,813,261, had been reduced to $2,022,256 on April 1. The trustee's balance continues unchanged at $750,262, this item representing unliquidated assets coming from Jonathan Warner, former president. Cash and Government securities on April 1 were approximately $3,000,000, against $1,606,000 Dec. 31. Common stock book value April 1 was $32.63 per share.

Earnings of Fairbanks, Morse & Co., Chicago, made a gratifying showing in the first three months of the current year, notwithstanding that the smallest portion of the company's business is usually done in that period. The net income after all charges in that period amounted to $525,012, or $1.06 a share on the 368,977 shares of no-par common stock, after allowing for preferred dividends. This compares with net income of $397,710, or 67c. a share, on the common stock, in the corresponding period last year. A comparison of the income account follows:

First Quarter	1926	1925
Gross income	$2,455,168	$2,030,339
Selling and administrative expenses	1,604,430	1,367,746
Depreciation	218,827	205,509
Pension fund	28,447	25,414
Net income	603,462	431,669
Federal taxes	78,450	51,958
7 per cent preferred dividends	131,705	131,706
Common dividends	276,653	239,766
Net surplus	116,652	8,239

Annual report for 1925 of Phelps Dodge Corporation, New York, shows income from sales of metals, etc., aggregating $39,707,085. Expenses of operation, including depreciation and interest, leave a net income previous to depletion of $5,058,007. This represents $10.11 per share on the 500,000 shares of capital stock. Depletion, however, took all of this and more and $2,000,000 in dividends had to be paid out of surplus. The balance sheet shows total assets of $233,785,277, of which current assets were $25,758,980. This is about 3½ times current liabilities, at $7,536,399. Gross value of plants, including mines, building, etc., is $198,026,297, against which a depreciation and depletion reserve has been set up of $86,081,036. Copper sold by the company in 1925 amounted to 287,884,234 lb., at a average net price of 14.044c. per lb. About one-eighth of the total was sold for export. Metals produced from ores of the corporation included 207,000,000 lb. of copper, 7,464,000 lb. of lead, 1,781,000 oz. of silver, and 41,165 oz. of gold. These figures were in addition to production from purchased ores.

Net earnings of the Hurley Machine Co., Cicero, Ill., in 1925 amounted to $729,330, or $4.03 a share on the capital stock, as compared with $854,189, or $4.74 a share, in the previous year. Early in 1926 the Electric Household Utilities Co. was organized to take over the business and assets of the Hurley Machine Co., stock being exchanged on a basis of two new for one old. On the new Electric Household stock, earnings would amount to half the amount reported per share for the Hurley Machine Co.

Machinery Markets and News of the Works

BUSINESS TAPERING OFF

Machine Tool Orders and Inquiries Are Fewer in Number

Sewing Machine Manufacturer Buys 25 Automatic Milling Machines—Other Buying Largely Confined to Single Tools

MACHINE tool buying continues to show a decline in volume, both orders and inquiries being fewer in number. Most of the sales are of single tools, an exception being 25 automatic milling machines to a sewing machine manufacturer.

Railroads have been somewhat more active in buying tools. The Southern Pacific and Peoria & Eastern have each bought a 90-in. driving wheel lathe and the Wabash bought a car-wheel borer and a wheel press. Other roads which have made purchases include the New York Central, Illinois Central, Michigan Central, Nashville, Chattanooga & St. Louis and the Delaware & Hudson. The Atlantic Coast Line has issued a fairly large inquiry.

In the automotive field the principal development is the announcement that the Chevrolet Motor Co. is planning on an extensive program of expansion and is now figuring on the purchase of gear hobbing machines and possibly other equipment.

The International Harvester Co. is creating a new manufacturing unit at Rock Island, Ill., in a building formerly used as a supply depot. Tools are being bought for the plant.

New York

NEW YORK, May 18.

DEMAND for some lines of machine tools has declined considerably. There is a fair amount of inquiry pending, but users are slow in placing orders. The largest business of the week in this territory was an order from a sewing machine manufacturing company for 25 automatic milling machines received by the Pratt & Whitney Co. The Niles-Bement-Pond Co. sold two 90-in. driving wheel lathes, one to a California railroad and the other to a road in the Central West. An Eastern road bought a 24-in. vertical drilling machine and a floor grinder. A manufacturer at Allentown, Pa., bought a 16-ft. gear generator. A company in New York which will manufacture a hair-cutting machine has bought a few tools. An electrical manufacturer bought a 10 x 60-in. thread milling machine. The Reed-Prentice Co., Worcester, Mass., bought a jig borer.

The Manhattan Refrigerating Co., 521 West Street, New York, has plans for extensions and improvements in its two-story cold storage plant at 84-88 Gansevoort Street, to cost about $35,000. T. A. Adams is president.

The Department of Street Cleaning, Municipal Building, New York, Alfred A. Taylor, commissioner, has received an appropriation of $1,025,000, for the construction of three refuse incinerating plants, two of which will be located in Queens, adjoining the present plant at Long Island City and near the Springfield Road, Springfield, L. I., to cost $375,000, each, with machinery; the third will be constructed at the foot of Taylor Street, West New Brighton, S. I., at an estimated cost of $275,000. The department will also complete plans for three additional such plants at Seventh Street and East End Avenue, and the Harlem River and 125th Street, to cost $1,175,000 and $1,000,000, respectively, with machinery; and in the Hunts Point section, Bronx, to cost $1,000,000. The department has secured another fund of $200,000 for dock dumping equipment for handling refuse into scows.

The Packard Motor Car Co. of New York, Broadway and Sixty-first Street, has filed plans for the construction of a five-story service, repair and garage building, 100 x 200 ft., at Columbus Avenue and Sixty-first Street, to cost about $400,000.

The Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing, etc., is said to have plans under advisement for rebuilding the portion of its naptholine plant at East St. Louis, Ill., destroyed by fire May 6, with loss estimated at $35,000 including equipment.

A. Kimball & Co., 307 West Broadway, New York, manufacturers of tags, labels, etc., are considering the erection of a new eight-story plant, 55 x 100 ft., to cost $300,000 with equipment. G. A. Wallin, company address, is in charge.

The Sikorsky Mfg. Co., Westbury, L. I., manufacturer of twin-engine airplanes, parts, etc., is said to be concluding arrangements for the purchase of the former plant of the Smith Body Co., at West Springfield, Mass., for a proposed new plant. Additional structures are also projected, with complete plant to include machine department, assembling works, hangars, etc. The company will remove its present business to the new location. Igor Sikorsky is head.

The Crankless Engine Co. of America, Inc., 29 Broadway, New York, Dr. E. H. Armstrong, head, is planning for production on an extensive scale of crankless Diesel engines for marine, railroad and industrial service. The company is said to have secured a large contract for early delivery.

The Mallinckrodt Chemical Works, 3600 North Second Street, St. Louis, manufacturer of technical chemicals, etc., has leased the entire building at 72 Gold Street, New York, for a term of years and will remodel and equip for a new factory branch and distributing plant. The company will remove its present branch at 30 Platt Street to the new location.

The Board of Education, Huntington, L. I., contemplates the installation of manual training equipment in the proposed three-story addition to its high school, estimated to cost about $200,000, for which bids will soon be asked on general contract. A. B. Sammis, Main Street, is architect.

The Double-Dee Roofing & Sheet Metal Co., New York, recently organized, has leased property at 673 Second Avenue, and will operate a new plant at this location. Alexander Dorfman and Louis Danker head the company.

The United States Cast Iron Pipe & Foundry Co., 71 Broadway, New York, has plans for a one-story addition to its works at East Burlington, N. J., reported to cost in excess of $65,000.

Pisciotta Brothers, 426 Troutman Street, Brooklyn, manufacturers of plumbing goods, etc., have asked bids on general contract for a new four-story plant, 68 x 90 ft., to cost about $100,000 with equipment. Laspia & Samenfeld, 269 Broadway, are architects.

Following its recent acquisition of the Aero Pulverizer Co., 90 West Street, New York, manufacturer of fuel-pulverizing equipment, the Power Specialty Co., 111 Broadway, is planning for expansion, to include the installation of complete steam-generating units, exclusive of boiler. The main plant is at Dansville, N. Y.

The Middlesex County Vocational School Board, County Record Building, New Brunswick, N. J., is asking bids on a general contract until June 3, for the erection of a three-

The Crane Market

THERE is but little new inquiry for overhead cranes. A sizable volume of business is before the market, however, and in a few instances, companies are reported preparing specifications for cranes. According to recent reports the General Electric Co. is preparing to purchase some overhead equipment soon. On the list of 24 cranes for the New York Rapid Transit Co., Brooklyn, N. Y., Westinghouse motors were originally specified. It is understood now that alternate bids on furnishing the same cranes with General Electric motors will be requested. The New York Central railroad, which is in the market for three 20-ton gantry cranes is reported to have closed on the crane for Rochester with a large Ohio builder of mill type cranes.

In the Chicago district, the General Boilers Co., Waukegan, Ill., is in the market for thirteen 1-ton and 2-ton electric hoists for Bristol, N. J. The United States Gypsum Co., Chicago, is inquiring for a bucket handling crane of 1½-cu. yd. capacity.

Among recent purchases are:

Fitzgibbons Boiler Co., 47 West Forty-second Street, New York, a 10-ton, 21-ft. span overhead crane from an eastern Pennsylvania builder.

Curtin Brothers, Little Ferry, N. J., a 15-ton crawl tread locomotive crane from the Link-Belt Co.

Roxana Petroleum Corporation, Chicago, two 12-ton crawl-tread locomotive cranes from the Orton Crane & Shovel Co.

Florida East Coast Railroad, Jacksonville, Fla., fourteen 1-ton and one 2-ton trolleys, from Alfred Box & Co.

Santa Fe Railroad, Corliss, Ill., a 5-ton electric traveling crane for a scrap yard, from Alfred Box & Co.

City of Detroit, a 25-ton locomotive crane from the Orton Crane & Shovel Co.

Grasselli Chemical Co., East Chicago, Ind., a 30-ton locomotive crane from the Orton Crane & Shovel Co.

Sprague Construction Co., Far Rockaway, N. Y., a 15-ton crawl tread locomotive crane from the Link-Belt Co.

Illinois Central, 11 overhead cranes for Paducah, Ky., shops; nine from the Shaw Electric Crane Co. and two from a Wisconsin builder.

story vocational school on Brunswick Avenue, Perth Amboy, N. J., estimated to cost $275,000 with equipment. Ingvard Greisen and M. G. Tuzik, 175 Smith Street, Perth Amboy, are architects. A. C. Clark is president.

Frederick Singer, Mountain Lakes, N. J., and associates have acquired a factory at West Dover, N. J., for about $50,000 and will remodel for the manufacture of transparent papers and kindred specialties.

The Board of Trustees, Princeton University, Princeton, N. J., is completing plans for the early erection of a new three-story school of engineering totaling about 70,000 sq. ft. of floor space, to include a mechanical engineering laboratory, electrical laboratory, hydraulic laboratory, machine shop, and other departments. The structure will cost about $600,000, of which more than $100,000 will be used for equipment. Day & Klauder, Franklin Bank Building, Philadelphia, are architects.

Rizzolo & Frallello, 22-24 Lexington Street, Newark, N. J., have filed plans for a one-story machine shop to cost about $22,000.

The Bonnell Motor Car Co., 39 Sussex Avenue, Newark, N. J., representative for the Dodge automobile, has taken out a permit for a one-story service, repair and garage building at 225-29 Warren Street, to cost $175,000, and will proceed with superstructure immediately. It will be 202 x 224 ft., divided into three unit buildings; a considerable portion of building No. 2, will be equipped for a machine and general repair shop, and of building No. 3, for a "quick service" department, tool works, blacksmith shop and accessory department.

The New York Wire & Spring Co., Fifteenth Street, Hoboken, N. J., manufacturer of automobile bumpers and springs, has taken over the factory of the United Last Co., Newark, N. J., recently acquired, and plans the early removal of the Hoboken business to this location, with the installation of additional equipment. The company plans improvements in the existing building and also contemplates the erection of a three-story extension later.

The plant of the Bell Electric Motor Co., Garwood, N. J., including complete machinery, manufacturing rights, etc., will be offered at a public sale on the premises on May 25.

The Board of Education, High School, Perth Amboy, N. J., Arthur E. Graham, secretary, is asking bids until June 3 for manual training equipment and supplies for the local schools for the ensuing year.

The Happiness Shaving Blade Corporation, 45 John Street, New York, has been organized with capital of $5,000 to manufacture steel razor blades.

Buffalo

BUFFALO, May 17.

CONTRACT has been let by the F. N. Burt Co., Ltd., 540 Seneca Street, Buffalo, manufacturer of paper boxes and containers, to the Metzger Construction Co., local, for a six-story addition, 180 x 230 ft., to cost $400,000 with machinery. Plumer & Mann, 700 Main Street, are architects.

The Folmer-Graflex Corporation, Rochester, N. Y., is being organized to take over the local plant and property of the Folmer-Century division of the Eastman Kodak Co. The new company will continue the present line of camera manufacture, including scientific cameras. It is expected to begin operations early in June. William F. Folmer, heretofore in charge of the Folmer-Century and Schwing divisions of the Eastman company, is president.

The Chemung Foundry Co., 502 Erie Street, Elmira, N. Y., has awarded a general contract to Pulford & Dempsey, 317 Pennsylvania Avenue, for a one-story foundry addition, 90 x 150 ft. Benjamin Rathburn is general manager.

The O'Dell & Eddy Co., Chaffee, N. Y., manufacturer of iron shoe lasts, etc., will rebuild the portion of its plant at Arcade, N. Y., recently destroyed by fire, with loss reported at close to $85,000 including equipment.

The Gould Paper Co., Lyons Falls, N. Y., is considering rebuilding the portion of its local newsprint mill destroyed by fire May 8, with loss in excess of $600,000 with machinery.

The Carbon-Alloy Steels Co., Ltd., Welland, Ont., has secured permission to dispose of a stock issue in New York State and purposes to use a portion of the fund for expansion. The company recently acquired the Welland plant of the Electro Steels & Metals Co., Ltd., for about $100,000, and plans extensive operations. Sidney Wiles is president.

The Delaware, Lackawanna & Western Railroad, Buffalo, is completing the construction of a new shop for light freight car repairs at its East Buffalo freight terminal. Heavy repairs to freight cars will be continued at the regular local repair shops as heretofore.

J. P. Flynn, 217 East Avenue, Rochester, architect, has plans under way for a new steam power plant and electric motor house at Pittsford, N. Y., to cost in excess of $75,000.

The Air Reduction Sales Co., Buffalo, is erecting a $75,000 gas plant on Military Road. Peter W. Kromer is district manager.

The Clark Brothers Co., Olean, N. Y., has placed contract for three buildings, including foundry and equipment shop, with the H. K. Ferguson Co., Cleveland.

Philadelphia

PHILADELPHIA, May 17.

BIDS will be received by the Board of Public Education, Keystone Building, Philadelphia, until June 1 for manual training equipment and supplies, furniture, etc., for the local schools. William Dick is secretary and business manager.

The Phoenix Iron Co., 22 South Fifteenth Street, Philadelphia, is disposing of a new bond issue of $1,000,000, a portion of the proceeds to be used for additions and improvements in its plant at Phoenixville, Pa., including equipment.

The Olney Foundry Co., 180 West Duncannon Avenue, Philadelphia, has awarded a general contract to the Northern Construction Co., 1502 North Fifth Street, for extensions and improvements in its foundry.

The American Furniture & Cabinet Co., Inc., Philadelphia, has leased the entire building at 231 Race Street for a local plant.

W. S. Gore, 1449 North Sixty-second Street, Philadelphia, contractor, has secured an award from a company whose name is temporarily withheld, for the erection of a two-story and basement automobile service, repair and garage building, 70 x 110 ft., on Manning Street, to cost $100,000 with equipment.

The Reading Railway, Reading Terminal, and the Baltimore & Ohio Railroad Co., Twenty-fourth and Chestnut

Streets, Philadelphia, have completed plans for the joint construction of a new produce freight terminal at Delaware and Weccaco Avenues, Jackson and Ritner Streets, estimated to cost $4,000,000. The project will include an eight-story cold storage and refrigerating plant, to be leased and operated by the Quaker City Cold Storage. Horace P. Serrill, president.

The General Electric Co., Witherspoon Building, Philadelphia, has awarded a general contract to the Turner Construction Co., for three additions to its plant at Elmwood Avenue and Sixty-eighth Street, each seven stories, 105 x 600 ft., 75 x 100 ft., and 74 x 105 ft., respectively, to cost more than $1,350,000 with equipment.

Day & Zimmermann, Inc., 1600 Walnut Street, Philadelphia, engineer, has plans for a two-story steam power house and mechanical laundry, 35 x 62 ft., at the Chestnut Hill Hospital, 8815 Germantown Avenue, to cost about $50,000 with equipment.

The Krich Light & Electric Co. and Radio Distributing Corporation, 306 Market Street, Newark, affiliated organizations, have acquired a four-story and basement building at 226-28 South Warren Street, Trenton, N. J., and will remodel for a branch works for both companies. J. Osborne Hunt, Hunt Building, Trenton, is architect.

Fire, May 13, destroyed a portion of the plant of the Schmidt & Ault Paper Co., Kings Mill Road, York, Pa., manufacturer of printing and wrapping papers, with loss reported at $100,000 including equipment. It is planned to rebuild.

The Board of Education, Ephrata, Pa., contemplates the installation of manual training equipment in its proposed high and grade school, estimated to cost $115,000. C. Emlen Urban, Woolworth Building, Lancaster, Pa., is architect.

The Reading Railway, Reading Terminal, Philadelphia, has filed plans for another addition to its car construction and repair shops at Reading, Pa., to be one-story, 150 x 740 ft. The work will be carried out in connection with a $5,000,000 expansion and betterment program.

The Mifflinburg Body Works, Mifflinburg, Pa., manufacturer of automobile bodies, is said to have preliminary plans under way for a two-story addition, to cost approximately $50,000 with equipment. William Sterling is general manager.

The Eyster-Weiser Co., York, Pa., manufacturer of iron castings, etc., plans to rebuild the portion of its foundry destroyed by fire May 13, with loss reported at $50,000 including equipment.

The South Penn Collieries Co., Scranton, Pa., has plans under way for development at its Sheppton properties, about 10 miles from Hazleton, Pa., including the construction of a large coal breaker, and the installation of electric power and mining machinery. It is disposing of a block of common stock, a portion of the fund to be used for the work. R. H. Buchanan is president; William C. Sproul, president General Refractories Co., 117 South Sixteenth Street, Philadelphia, is chairman of the board.

The Pacific Steel Boiler Corporation, Bristol, Pa., is in the market for an 84-in. light duty boring mill.

South Atlantic States

BALTIMORE, May 17.

FIRE, May 7, destroyed three buildings at the fertilizer manufacturing plant of the Eastern Cotton Oil Co., Money Point, Va., with loss reported at $200,000 including machinery. Plans are being considered for rebuilding.

The Mount Airy Veneer Co., Mount Airy, N. C., has completed plans for the erection of a new four-story mill, 60 x 120 ft., to cost close to $65,000 with equipment. W. E. Lindsay is head.

The Highland Park Sand Co., 1604 Grove Avenue, Richmond, Va., has inquiries out for a quantity of 45-lb. relaying rails; also for a number of side dump cars, each about 4-yd. capacity.

The Durham Produce Co., Blackwell Street, Durham, N. C., has plans for a one-story and basement cold storage and refrigerating plant, to cost $45,000.

The Asheville Supply & Foundry Co., Eagle Street, Asheville, N. C., has acquired a tract of about 20 acres fronting on the line of the Southern Railway, and is said to be planning to use a portion of the site for a new one-story foundry.

The Taylor-Parker Co., Water and Commercial Streets, Norfolk, Va., has inquiries out for a locomotive crane, standard gage, about 15 tons capacity, with 40 to 50 ft. boom; would consider rental basis with option to purchase.

The Board of Commissioners, District of Columbia, District Building, Washington, is asking bids until June 4 for one gasoline engine-driven portable air compressor unit; until June 3 for a quantity of T-rails, and until June 7 for 10,132 ft. of signal cable for the electrical department.

The Board of Education, Burgaw, N. C., is considering the installation of manual training equipment in a proposed new high school, estimated to cost $100,000. L. N Boney, Murchison Bank Building, Wilmington, N. C., is architect.

The Southern Furniture Co., Burlington, N. C., recently formed with a capital of $250,000, is considering plans for a new factory, to cost in excess of $75,000 with machinery. Eugene Holt is one of the heads of the company.

The Black & Decker Mfg. Co., Towson, Baltimore, manufacturer of electric drills, electric shop tools, etc., has acquired property at Oakland, Cal., totaling 30,000 sq. ft., as site for a new factory branch and distributing plant for which plans will soon be drawn. Pacific Coast offices are at 75 Fremont Street, San Francisco.

The Savannah Electric & Power Co., Savannah, Ga., is completing plans for an addition to its steam-operated electric generating plant on West Broad Street, to cost about $200,000 with machinery.

The R. S. Armstrong & Brother Co., 676 Marietta Street, Atlanta, Ga., machinery dealer, has inquiries out for several slip ring type motors, 50 to 75 hp. each.

The Southern Pulp & Naval Stores Co., 42 Broadway, New York, C. M. Thorsen, president, has preliminary plans under way for a proposed new pulp mill and auxiliary plant at Dublin, Ga., reported to cost about $500,000 with machinery. A power house will be built.

The Wallace Pen Co., Columbia, S. C., recently formed by Dr. J. M. Wallace, Columbia, and associates with a capital of $100,000, is arranging for the early establishment of a local plant to manufacture a new type of fountain pen. The initial factory is reported to cost about $25,000.

The Seventh Street Garage, Seventh and Leigh Streets, Richmond, Va., has plans under way for a new multi-story addition, 90 x 135 ft., to its service, repair and garage building, with capacity of about 700 cars, reported to cost in excess of $175,000 with equipment. W. L. Ragland & Sons, Merchants' National Bank Building, are architects.

The Green River Mfg. Co., Tuxedo, N. C., has been making inquiries for a centrifugal pumping unit, with 5-in. suction and 4-in. discharge, motor-driven.

The Rome Stove & Range Co., Rome, Ga., has awarded a general contract to the Ingalls Iron Works, Birmingham, for a one-story addition, 60 x 300 ft. The company is said to be planning the installation of additional equipment to advance the present capacity about 50 per cent, with cost approximating $60,000. John M. Berry is president.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a two-drum hoist, belt-driven, skeleton type.

The Guinn Sign Co., La Grange, Ga., manufacturer of metal signs, is planning for extensions, to include the installation of a metal-enameling department. John W. Guinn is president.

The Portsmouth Cotton Oil Refining Corporation, Portsmouth, Va., Louis Rosenstein, president, has acquired the factory of the Southern Fibre Co., Norfolk, Va., including two buildings on a 70-acre tract. Plans are under way for using an existing two-story structure for a branch plant, which will be remodeled.

The Board of Directors, Reinhardt College, Waleska, Ga., will proceed with the construction of a new two-story building, 60 x 100 ft., to be known as the Dobbs vocational school. A list of equipment will soon be arranged. T. J. Mitchell, Atlanta, Ga., is architect. R. K. Sharp is president.

St. Louis

ST. LOUIS, May 17.

PLANS are being drawn by the Department of Public Utilities, Water Department, St. Louis, for extensions and improvements in the steam power plant at Howards Bend, with the installation of boilers, coal handling equipment, pumping machinery and accessory apparatus, estimated to cost close to $1,000,000.

The Phillips Petroleum Co., Bartlesville, Okla., is said to have plans under consideration for a new gasoline refinery in the vicinity of Cisco, Tex., to cost approximately $200,000 with machinery.

The City Council, Trenton, Neb., has plans under way for a new municipal ice-manufacturing plant. A bond issue will soon be arranged. A. L. Taylor is city clerk.

The Herman Body Co., 1831 South Third Street, St. Louis, manufacturer of automobile bodies, will erect a new one-story plant, 110 x 200 ft., to cost about $70,000 with equipment.

The Interstate Rock & Crusher Co., Waldo Bank Building, Kansas City, Mo., contemplates the installation of equipment in its plant on Eighty-ninth Street, including crushing machinery, power equipment, steel cars for rock hauling, etc.

Fire, May 3, damaged a portion of the plant of the Kansas City Auto Spring Co., 1824-28 Locust Street, Kansas City, Mo. An official estimate of loss has not been announced.

E. J. Thomas, 3414 Karnes Street, Kansas City, Mo., has filed plans for a one-story foundry, 50 x 75 ft., for which a building contract has been let to S. W. Hite, Merriam, Kan.

The Southern Ice & Utilities Co., Dallas, Tex., is arranging for a new one-story ice manufacturing plant at Gurdon, Ark., with initial output of 40 tons per day.

The Missouri-Kansas-Texas Railroad is in the market for a 1,000 cu. ft. air compressor.

The Common Council, Covington, Okla., is considering the installation of pumping equipment in connection with extensions and improvements in the municipal waterworks, estimated to cost $35,000. C. A. Wood, Stillwater, Okla., is engineer.

The Board of Education, Little Rock, Ark., plans the installation of manual training equipment in its proposed four-story and basement high school on Park Avenue, estimated to cost $800,000, for which bids are being asked on a general contract until May 31, Wittenborg, Delony & Watts, Home Life Building, are architects.

The Metropolitan Utilities District, City Hall, Theodore H. Liesen, general manager, has plans for a three-story and basement equipment storage and distributing plant with automobile service, repair and garage department, 138 x 170 ft., estimated to cost $350,000. John Latenser & Sons, Peters Trust Building, are architects.

Milwaukee

MILWAUKEE, May 17.

THE first half of May has not been without encouraging features in the machine-tool market. Sales have been of a fair volume, and inquiries moderate. While most sales have been in single to two or three items, prospects appear to be favorable to some fair-sized lots. The Chevrolet Motor Co. of Flint, Mich., is inquiring for miscellaneous equipment for several plant additions, among them an extension of its branch factory at Janesville, Wis. Local foundries and machine shops are active buyers, the bulk of the business being for replacement and minor capacity extensions. Demand for factory help, according to employment office reports, is principally in the metal trades.

The Butler Bin Co., Waukesha, Wis., has been incorporated with $100,000 capital stock and organized by Morgan R. Butler, highway construction contractor and mayor of Waukesha, to manufacture a line of steel devices and appliances for handling cement and concrete mixtures, storing aggregates, hoists and elevators, and other equipment for road and general construction. Contracts has been let for the erection of a machine and assembling shop costing about $65,000, and inquiry is being made for a considerable list of miscellaneous equipment. Alex R. Morton and S. A. Perkins are associated with Mr. Butler.

The Hammer Blow Tool Co., 1016 First Street, Wausau, Wis., manufacturer of specialized garage implements, sustained an estimated loss of $150,000 by fire which destroyed its factory on May 11. Plans for rebuilding are under way. The company was originally established as the Danielson Tool Works, taken over in 1923 by Thomas H. Jacobs. It produces tractor lugs, roller bearing pulleys, clutch latches, belt rollers and other automotive parts and specialties.

The P. H. Webber Co., Hoopeston, Ill., manufacturer of shock absorbers, shackle bolts and automotive shop equipment, has transferred its entire operation to Racine, Wis., where it has leased space in the Racine Industrial Plant. Some additional equipment is being acquired to manufacture super-charging types of manifolds for gas engines under license from the inventor and patentee, P. J. F. Batenburg, automotive engineer, Racine. R. S. Webber is president and general manager.

The Milwaukee Central Board of Purchases, City Hall, closes bids May 24 for one 100-hp. electric motor and control; 175,000 ft. of steel-taped parkway and lead-covered cables, and one crawler type trailer. Joseph W. Nicholson is chief buyer.

The Simplex Furnace Co., Racine, Wis., has been incorporated with a capital stock of $200,000 by F. J. Kidd, Mortimer E. Walker and Charles F. Wratten, to manufacture pipeless and other furnaces and hot air heating devices. It is understood that the new corporation will take over the business of the Simms Foundry Co., Racine, which has been inactive for several months pending a financial reorganization.

The Common Council, Edgerton, Wis., is taking bids until May 25 for erecting and equipping an additional pumping station for the municipal waterworks. A 500-gal. per min. motor or engine-driven centrifugal pump and one 6-in. turbine meter will be required. W. G. Kirchhoffer, Madison, Wis., is consulting engineer, and C. A. Hoen is city clerk.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has let contract to J. H. Findorff & Son, 601 West Wilson Street, Madison, Wis., for the construction of a $100,000 motor truck service station and branch headquarters building, 120 x 130 ft., at Madison. W. D. Price is superintendent of construction.

A. C. Fosdick & Co., machinists, 1634 Schiller Court, Madison, Wis., have broken ground for a new machine shop and service building, 60 x 100 ft., to cost about $45,000 complete.

The Wisconsin University Building Corporation, Madison, Wis., closes bids May 27 in the office of M. E. McCaffrey, secretary, for the refrigerating machinery, electric freight and passenger elevators, cold storage insulation, lighting fixtures and other needs for the new refectory, now being completed at a cost of $500,000. Arthur Peabody, Madison, State architect, is in charge.

The General Foundry Co., 160 Marion Street, Oshkosh, Wis., sustained a considerable loss by fire which wrecked its plant on May 13. The structure was 40 x 150 ft., originally built by the Old Reliance Boiler Works. More recently it was owned and operated by E. C. Ahlswede, who is planning to rebuild.

Cincinnati

CINCINNATI, May 17.

IN the first half of May, machine tool sales in the local market paralleled those in the same period in April. Some builders, however, report a slight decrease. Inquiries are not as promising as a few weeks ago, and many manufacturers believe that there will be no buying on an extensive scale until fall. Issuance of a large list by the Atlantic Coast Line was the outstanding development of the week. This inquiry calls for a number of lathes and turret lathes.

Railroads have been the most active purchasers of equipment. While no carrier has taken more than a few tools, sales in the aggregate have been large. The Southern Pacific bought a 90-in. heavy driving wheel lathe, and the Peoria & Eastern purchased a 90-in. standard driving wheel lathe. The Wabash has contracted for a 48-in. carwheel borer and a 48-in., 400-ton wheel press. Other roads which have bought tools include the New York Central, Illinois Central, Michigan Central, Nashville, Chattanooga & St. Louis, and the Delaware & Hudson.

The Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., purchased four Long & Allstatter machines, consisting of a shear, punch, notching machine and a straightening machine. The Inland Steel Co., Chicago, bought a 2-in. Acme double-bolt cutter for its Indiana Harbor plant. An automobile maker in the Detroit district purchased three lathes, and a Dayton, Ohio, company has taken a jig borer. A large industrial company bought two frog and switch planers locally. The Moore Drop Forging Co., Springfield, Mass., bought a 26-in. upright drill, and the Lycoming Mfg. Co., Williamsport, Pa., took a 20-in. drill. The Magnavox Corporation, Oakland, Cal., purchased a Brown & Sharpe automatic screw machine.

The Crosley Radio Corporation, Colerain and Sassafras Streets, Cincinnati, is taking bids on a general contract for a six-story addition, to cost close to $225,000 with equipment. Samuel Hannaford & Son, Dixie Terminal Building, are architects.

The Board of Education, Columbus, Ohio, contemplates the installation of manual training equipment in the proposed McKinley junior high school in the north end section, to be three stories, estimated to cost $475,000. Howard Dwight Smith, 207 East State Street, architect, will ask bids in the fall.

Officials of the Garford Motor Truck Co., Lima, Ohio, have formed the Garford Truck Co., under Delaware laws, capitalized at $4,500,000, to take over and expand the present plant and business.

The Superior Motor Coach Body Co., East Kibby Street, Lima, Ohio, has awarded a general contract without competition to the Lima Construction Co., Business College

Building, for a one-story addition, 60 x 490 ft., to cost $150,000 with equipment. H. L. Breckenridge is president.

The Maury County Ice Co., Columbia, Tenn., recently formed with a capital of $35,000, has preliminary plans for a new one-story plant on East Seventh Street. S. B. Stephens, Columbia, is head.

The Common Council, Portland, Tenn., is considering the installation of pumping equipment in connection with a proposed municipal waterworks estimated to cost about $45,000.

The Tennessee Paper Mills, Chattanooga, Tenn., have plans under way for an addition, to cost close to $500,000 with machinery. Considerable special paper mill equipment will be installed. The company is now completing the erection of a new power house with capacity of 1000 kw. A. M. Sheperd is vice-president and general manager.

The Board of Public Service, City Hall, Dayton, Ohio, G. F. Baker, director, has plans under way for a new three-story and basement equipment storage and distributing plant, including automobile service, repair and garage for municipal cars, to be 80 x 100 ft., estimated to cost $125,000 with equipment.

The Dunlap Furniture Mfg. Co., Dunlap, Tenn., has plans for an addition to cost about $30,000 including equipment. Contract for a portion of the machinery has been let. D. M. Dunlap is president.

The Southern Cities Power Co., Provident Building, Chattanooga, Tenn., has work in progress on extensions in its power plant in the Cannon Creek mining section, to include the installation of a 250-kw. generator and auxiliary equipment. It is also building a new cold storage and refrigerating plant at Shelbyville, Tenn., and a new automatic ice-manufacturing plant at Pikeville, Tenn. The complete expansion program will cost in excess of $75,000.

The Aircraft Mfg. Co., 17 Madison Avenue, Dayton, Ohio, has been incorporated to build ventilating fans and other metal devices. G. N. Missogenis is the general manager.

The Mahan Foundry Co., Miami Chapel Road, Dayton, has been incorporated for $10,000 and will operate a gray iron foundry business. Harry F. Mahan is general manager.

The Ohio Iron & Supply Co., 900 St. Johns Avenue, Lima, Ohio, is in the market for two used pipe machines, one from 2 to 10 or 12 in. and the other from 1 to 4 in.

New England

BOSTON, May 17.

THE quietness that has prevailed in the machine tool market for several weeks continues. Sales of small tools, however, are in fair volume.

E. P. Washburn, Marion, Mass., has acquired a factory on Maple Street, Warren, Mass., heretofore used by the Monarch Valve Mfg. Co., and will remodel for the manufacture of chairs and other furniture.

The Mack International Motor Truck Co., 75 North Beacon Street, Boston, has asked bids on a general contract through the Warren Engineering Co., 50 Terminal Street, engineer, for a two-story addition to its service, repair and garage building, approximating 40,000 sq. ft., estimated to cost in excess of $125,000. Headquarters are 25 Broadway, New York.

The Gunning Boiler & Machine Co., Hathaway Road and Shawmut Avenue, New Bedford, Mass., has tentative plans for rebuilding the portion of its plant destroyed by fire May 5, with loss reported at $35,000 including equipment.

The Carlisle-Ayer Co., 55 Portland Street, Boston, manufacturer of doors, sash, etc., has acquired property in the vicinity of Clyde and Warwick Streets, Somerville, Mass., and contemplates a new factory branch and distributing plant to cost about $100,000 with equipment.

Officials of the Warren Steam Pump Co., Warren, Mass., organized in 1897 as a cooperative concern, have formed the Warren Steam Pump Co., Inc., with capital of $450,000, to take over and expand the present organization. H. K. Hallett will be president, and William W. Shuttleworth, treasurer.

The Boston Cutting Die Co., 202 A Street, Boston, has plans under way for a new one-story factory to cost about $40,000 with equipment. E. W. Hanson is head.

Fire, May 7, destroyed a portion of the plant of the Mather Chair Co., Whitmanville, Mass., manufacturer of chairs and other furniture, with loss estimated at $23,000. It is planned to rebuild.

The Lawrence Gas & Electric Co., Lawrence, Mass., will begin the construction of a four-story repair and service building for its electric and gas divisions, including electric meter and gas meter departments, machine and repair shops, etc, to cost in excess of $75,000 with equipment. Fred H. Sargent is vice-president.

The Walker-Hoops Mfg. Co., Warwick Street, Middletown, Conn., manufacturer of automobile equipment and accessories, has acquired a four-story factory in the vicinity of Center and College Streets, 50 x 140 ft., and will remodel for a new works. It is purposed to remove the present plant to the new location and install additional equipment.

The Moore Drop Forging Co., Springfield, Mass., has taken out a permit for extensions and improvements in its plant on Birnie Avenue.

The Blackstone Valley Gas & Electric Co., Pawtucket, R. I., is disposing of a bond issue of $4,000,000 a portion of the fund to be used for extensions and improvements in power plant and system.

H. F. Kellogg, 278 Stuart Street, Boston, architect, has plans for a three-story automobile service, repair and garage building at Pleasant and Waldo Streets, Brookline, Mass., to cost in excess of $150,000 including equipment.

Officials of Manning, Bowman & Co., Meriden, Conn., manufacturers of enameled ware, utensils, etc., have formed a new company under the present name with capital of $19,200,000, to succeed to and expand the present organization.

Chicago

CHICAGO, May 17.

THE demand for machine tools continues to taper off Purchases are few in number and are largely the result of inquiries which have been in the hands of dealers for some time. New inquiry is also in less volume and buyers generally are not pressing for quotations. The price situation is steady and deliveries, especially on standard tools, are improving slowly.

The Santa Fe has placed three frog and switch planers and is about to take action, at Topeka, Kan., on its pending list. The International Harvester Co. is closing on tools for its Rock Island, Ill., plant, which is being changed from a supply depot to a manufacturing unit. Good prices were obtained for the machine tool equipment auctioned at the Ansted Engineering Co.'s plant at Connersville, Ind.

The Chicago Steel Tank Co., 1301 South Fifty-fifth Court, Cicero, Ill., has leased 213,000 sq. ft. of ground space at 6600 South Narragansett Avenue, Chicago, from the Clearing Industrial District and will occupy the property as soon as a one and two-story factory building is completed. Plans are being drawn by F. C. Faltz & Co.

The Ellis Stone Co., 4837 West Grand Avenue, Chicago, will build a one-story factory, 90 x 157 ft., for cutting stone, to cost $25,000. Lind & Erickson, 915 North Mayfield Avenue, is the general contractor.

The Crane Co., 4100 South Kedzie Avenue, Chicago, will build a three-story brick factory to cost $450,000. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are the architects.

John A. Boye, 905 Lakeside Place, Chicago, manufacturer of metal novelties, will build a one-story brick factory, 146 x 160 ft., to cost $45,000. W. C. Presto, 160 North La Salle Street, is the architect.

The McKeown Brothers Co., 112 West Adams Street, Chicago, building contractor, will erect a one-story factory, 80 x 220 ft., to cost $30,000.

Darling & Co., East St. Louis, Ill., manufacturers of fertilizer products, have awarded a general contract to the Austin Co., for a one-story addition, 120 x 135 ft., to cost $70,000 with equipment.

The Board of Education, Corning, Iowa, plans the installation of manual training equipment in its proposed two-story high and grade school, to cost $165,000, for which bids have been asked on general contract. Thomas, McLennan & Thomas, 527 Seventeenth Street, Des Moines, Iowa, are architects.

The Iowa Power & Light Co., Des Moines, Iowa, operated by the Des Moines Electric Light Co., is disposing of a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. Clement Studebaker, Jr., is president.

The Vanadium Corporation of Colorado, Electric Building, Grand Junction, Colo., George Kunkle, president, will soon begin the construction of a one-story addition to its mill, to cost $200,000 including machinery, at Rifle, Colo.

John Hocke, 1604 East Seventy-ninth Street, Chicago, architect, has completed plans for a two-story and basement

automobile service, repair and garage building, 100 x 150 ft., at 3646-54 Broadway, to cost $80,000.

The James H. Boye Mfg. Co., 412 Orleans Street, Chicago, manufacturer of brass and bronze castings, etc., has acquired property at Berteau and Kilpatrick Avenues, totaling 52,000 sq. ft., and will soon have plans drawn for a new one-story foundry, to cost $50,000 with equipment.

The City Council, Longmont, Colo., will hold in abeyance the construction of its proposed municipal electric light and power plant, estimated to cost $75,000, for which plans were recently drawn by Wood & Webber, Tramway Building, Denver, Colo., engineers.

Fire, May 4, destroyed a portion of the factory of the Brooks Parlor Furniture Co., 1115 East Hennepin Avenue, Minneapolis, Minn., with loss reported at $100,000 including equipment. It is planned to rebuild.

The Crowe Name Plate & Mfg. Co., 1749 Grace Street, Chicago, is asking bids on a general contract for a two-story and basement addition, to cost about $50,000 with equipment. C. A. Eckstrom, 5 North La Salle Street, is architect. I. O. Barrett is president.

The Biflex Products Co., North Chicago, Ill., manufacturer of automobile bumpers, etc., has awarded a general contract to Tobias Jensen, 825 North Avenue, Waukegan, Ill., for two one-story additions, 125 x 180 ft., and 100 x 150 ft., to cost $350,000 including equipment. The structures will replace in part buildings recently damaged by fire. Melvin B. Ericson is general manager.

Prouty Brothers, Tenth Foor, Exchange Building, Denver, Colo., engineers and contractors, will erect a new metal plant and smelting furnace at Idaho Springs, Colo., to cost approximately $100,000 with equipment. It will be owned and operated by C. L. Cusick and associates.

The Chicago Steel Foundry Co., 3720 South Kedzie Avenue, Chicago, is inquiring for a 1 or 1¼-cu. yd. single line grab bucket for operating within 12-ft. headroom.

The Diamond Motor Parts Co., St. Cloud, Minn., is in the market for 500 steel shop boxes, taper or straight, 18 in. x 12 in. x 6 in., or near this size.

Gulf States

BIRMINGHAM, May 17.

PLANS are being completed by the Texas Central Power Co., San Antonio, Tex., for a new steam-operated electric generating plant at Goliad, Tex., to cost in excess of $75,000 with equipment. E. B. Neiswanger is general manager.

The Currie-Paxton Corporation, Hattiesburg, Miss., has acquired the plant and business of the F. K. Paxton Co., and contemplates expansion. The new organization will specialize in the production of steering wheels, running boards and other kindred equipment for automobiles. T. K. Currie is president.

The Humble Oil & Refining Co., Houston, Tex., has preliminary plans for the construction of a pipe line from the Mirando, Tex., field, vicinity of San Antonio, to the coast, at or near Corpus Christi, Tex., to cost in excess of $600,000.

The Pease Co., Miami, Fla., manufacturer of sash, doors, etc., is considering rebuilding the portion of its mill and distributing plant destroyed by fire May 10, with loss estimated at $125,000 including machinery.

R. C. Fullbright, 1202 State National Bank Building, Houston, Tex., has filed plans for a new one-story machine shop, 24 x 60 ft.

The Texas Power & Light Co., Dallas, Tex., has acquired the municipal electric light and power plant at Nacogdoches, Tex., and plans extensions in this section, including transmission line construction. It has work in progress on a new steam-operated electric generating plant at Trinidad, Tex.

The Campbell-Whitaker Co., 501 S. W. Third Avenue, Miami, Fla., has taken out a permit for the erection of a new plant to manufacture cast cement products, to cost about $23,000 with equipment.

The Florida Power & Light Co., Miami, Fla., will proceed with the erection of a new steam-operated electric generating plant at Punta Gorda, Fla., with initial capacity of 5000 kw.

The Hindman Tool Co., Houston, Tex., manufacturer of oil-well tools, has arranged for the establishment of a new plant at Galveston, Tex., where headquarters will be established at once. It is proposed to develop increased operations at the Galveston works with view to the erection of a new manufacturing unit, specializing in a patented universal subswivel for rotary drilling. The Houston business will be removed to Galveston. S. J. Hindman is president, and G. W. Hindman, secretary and general manager.

The Oklahoma Steel Castings Co., Tulsa, Okla., has approved plans for the erection of its proposed branch plant at Houston, Tex., consisting of a one-story foundry, 110 x 160 ft.; machine shop and warehouse, 20 x 50 ft.; pattern shop and pattern storage, 40 x 160 ft., and other structures. It is purposed to have the plant ready for service in July, with initial cost placed at $125,000. Ernest H. Cornelius is president.

Fire, May 2, destroyed the municipal electric light and power plant and waterworks at Jasper, Fla., with loss estimated at $35,000. The Common Council has tentative plans for rebuilding.

The Grubstake Investment Association, 615 National Bank of Commerce Building, San Antonio, Tex., has inquiries out for a quantity of steel coil springs for guying oil-well derricks and other service. W. M. Stephenson is head.

The Upham Gas Co., Wheeler, Tex., is planning the construction of a pipe line from the Wheeler natural gas producing field to Wichita Falls, Tex., about 350 miles, estimated to cost $5,000,000.

The Freeport Light, Water & Ice Co., Freeport, Tex., has tentative plans for extensions and improvements in its water plant, to include the installation of centrifugal pumping machinery and auxiliary equipment.

The National Turpentine & Products Co., Mobile, Ala., is considering rebuilding the portion of its plant destroyed by fire May 6, with loss estimated at $50,000 including equipment.

The Fort Lauderdale Paper & Bag Co., Fort Lauderdale, Fla., J. Harrison McCready, president, recently formed with a capital of $100,000, has acquired property in the Chateau Park terminal section for a one-story plant, 60 x 180 ft., for the manufacture of paper bags and containers, as well as paper cups, etc. The initial mill is reported to cost close to $60,000 with equipment. E. J. Powers, Fort Lauderdale, is secretary.

The City Council, Biloxi, Miss., plans the construction of a pumping plant in connection with proposed extensions and improvements in the municipal waterworks, with the installation of 2500-gal. per min. and one 1500-gal. per min. capacity pumping units, with auxiliary equipment. A. S. Madding is city engineer.

The Brown-Florida Lumber Co., Caryville, Fla., is considering rebuilding the portion of its plant, including three sawmills, planing mill, power house and other structures, destroyed by fire May 6, with loss reported in excess of $500,000 including machinery.

The Texas Laundry Machinery Co., 1448 North Zang Boulevard, Dallas, Tex., plans the early removal of its business at San Antonio, Tex., to a plant at Dallas, where the capacity will be increased.

Cleveland

CLEVELAND, May 17.

THE volume of machine tool business continues light. Dealers are getting a fair amount of inquiry which is slow in materializing into orders. The market in Detroit has been a little more active the past week, but sales were confined to one or two machines. In spite of the present large production capacity of the automobile industry, the period of expansion has evidently not been halted, at least with some automobile builders who have been doing a large volume of business this year. The Chevrolet Motor Co. is working on an extension program and is figuring on the purchase of gear hobbing and possibly other equipment, although definite inquiries have not yet been issued. A Cleveland manufacturer of turret lathes reports a fair amount of business entirely in single machines. A local manufacturer has purchased a 13-in. Pratt & Whitney lathe.

The Ohio Tubular Products Co., London, Ohio, has been incorporated to manufacture auger posts for use with all types of advertising signs. It will also manufacture tubular steel tent poles and assemblies as used by automobile tourists. The company is operating in a leased building, but may have plans later for a factory of its own. H. A. Tyson is vice-president and general manager.

The Barberton Foundry Co., Barberton, Ohio, is contemplating the erection of a new foundry.

The city of Alliance, Ohio, will build a sewage disposal plant. George B. Gascoigne, Leader News Building, Cleveland, is the engineer.

The Hobert Mfg. Co., Troy, Ohio, will build a three-story factory, 110 x 130 ft.

The Lead Surfaced Steel Co., recently incorporated in Youngstown, has established a plant at Sycamore Street and Andrews Avenue, in that city, for the lead surfacing of sheet steel.

The Sani-Tabl-Tub Co., Alliance, Ohio, organized recently to manufacture a patented all-steel combination table, has leased a building at Rush Street and Fifth Avenue. Some equipment will be purchased and production started at once. I. Koch is president, and J. Koch secretary and treasurer.

Detroit

DETROIT, May 17.

PLANS are being prepared by the Wolverine Tube Co., 1411 Central Avenue, Detroit, manufacturer of steel tubing, etc., for a two-story addition, reported to cost in excess of $60,000, with equipment. Carey & Esselstyn, Hofman Building, are architects.

Fire, May 6, destroyed a portion of the two-story factory at 2614 West Warren Avenue, Detroit, occupied by the Casket Hardware Mfg. Co. and the D. S. L. Radio Corporation, with combined loss estimated at $45,000 including equipment. It is planned to rebuild.

The Atlas Drop Forge Co., Lansing, Mich., has begun the erection of an addition for the repair and pattern departments, reported to cost about $35,000.

The Chamber of Commerce, Eaton Rapids, Mich., is in negotiation with a company manufacturing radio equipment, name temporarily withheld, which proposes to establish a local plant. A building will be secured or a new factory constructed.

The Michigan Electric Railway Co., 229 South Mechanic Street, Jackson, Mich., is said to have tentative plans under way for rebuilding the portion of its car repair shops at Albion, Mich., recently destroyed by fire with loss reported in excess of $500,000 including equipment. J. F. Collins is vice-president and general manager.

The Chevrolet Motor Co., Flint, Mich., has plans under way for enlargements to increase the present capacity about 30 per cent, providing for the employment of about 1200 additional operatives. The expansion is reported to cost more than $600,000 with equipment. Charles F. Barth is general manager.

The Detroit Cab Co., 565 East Larned Street, Detroit, has plans nearing completion for a two-story service, repair and garage building to cost $150,000 with equipment. Carey & Esselstyn, Hofman Building, are architects. Angus Smith is president.

The City Commission, Saginaw, Mich., is reported to be planning the early purchase of electrically-operated pumping machinery for a new station for the municipal waterworks.

The Grand Rapids Wood Finishing Co., 61 Ellsworth Street, Grand Rapids, Mich., has tentative plans under consideration for a one-story addition to cost about $40,000. H. H. Turner, Michigan Trust Building, is architect.

The Lufkin Rule Co., Saginaw, Mich., manufacturer of steel rules, tapes, etc., has awarded a general contract to the W. E. Wood Co., Ford Building, Detroit, for a three-story and basement addition, 100 x 142 ft., to cost $70,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects.

The Board of Education, Constantine, Mich., contemplates the installation of manual training equipment in a proposed two-story and basement high and grade school estimated to cost $120,000, for which bids will soon be asked on a general contract. Billingham & Cobb, Press Building, Kalamazoo, Mich., are architects.

The Lenawee Sand & Gravel Co., Adrian, Mich., has tentative plans for enlargements and installation of additional equipment.

Pittsburgh

PITTSBURGH, May 17.

MACHINE tool business in this district is steady but only in moderate volume, with sales chiefly confined to single tools. Orders for the first half of this month, however, compare favorably with the same period in April. Inquiries are fairly numerous and include two lists each calling for six or seven tools, but details are withheld. The Carnegie Steel Co. is taking prices on a large punch to serve the new 52-in. H-beam mill. This punch will have ram pressure of 500 or 600 tons and will weigh approximately 100,000 lb. complete.

The sites of the abandoned Painter mills, Carnegie Steel Co., and Singer-Nimick mills, Crucible Steel Co. of America, on Carson Street, Pittsburgh, have been acquired by the Pittsburgh & Lake Erie Railroad, at $3.25 per sq. ft. The Crucible company's property contained 207,546 sq. ft., and that of the Carnegie Steel Co., 245,027 sq. ft. The sites have been cleared and the erection of a large terminal warehouse is understood to be included in the plans of the railroad.

Plans are being completed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, for an addition to its branch plant at Sharon, Pa., to cost close to $250,000. It will be equipped primarily for the manufacture of electric transformers and parts.

The Mercer County Light, Heat & Power Co., Greenville, Pa., is planning for extensions in the vicinity of Sharon, Pa., including a switching station, transmission lines, etc.

The Penn-Ohio Edison Co., Sharon, Pa., has arranged for a preferred stock issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements in power plant and system. Headquarters are at Youngstown. R. P. Stevens is president.

The Correct Measure Co., Moose Temple Building, Rochester, Pa., manufacturer of pumping equipment, etc., has awarded a general contract to the Inland Construction Co., 5612 Pennsylvania Avenue, Pittsburgh, for a one-story addition to its plant at Fallston, near New Brighton, Pa., to cost $90,000 with equipment. John R. Foster is president.

The La Lance Equipment Co., 713 Second Avenue, Huntington, W. Va., S. W. La Lance, president, is said to have closed negotiations for the purchase of the plant and business of the Huntington Implement Co., 745 Third Avenue. Expansion is planned.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, has plans for the construction of a 6-in. pipe line in the Coal Run section, Fairmont, W. Va., to be used for oil-pumping service from barges.

The Parkersburg Corrugated Box Co., 1722 Avery Street, Parkersburg, W. Va., recently organized with George McDonald as president, is in the market for machinery for its proposed local plant. Contract has been let to the Plate Construction Co., 726 Jeannette Street, for a building, 100 x 200 ft.

The American Glue Co., Springdale, Pa., has plans for the installation of a filter plant for the treatment of wastes from the factory. Headquarters are at 121 Beverly Street, Boston.

The Wheeling Machine Products Co., 1920 Main Street, Wheeling, W. Va., has acquired a building in the Slacktown section and will remodel for a new plant.

Indiana

INDIANAPOLIS, May 17.

BIDS have been asked by the Standard Woodworking Co., La Fayette, Ind., for a one-story addition, 65 x 100 ft., to cost close to $30,000 with equipment.

The Indianapolis Power & Light Corporation, Indianapolis, recently organized to take over and expand the Indianapolis Light & Heat Co., is disposing of a bond issue of $10,000,000, a portion of the proceeds to be used for extensions and improvements in plants and system. Walter C. Marmon is president.

The Board of Education, La Fayette, Ind., contemplates the installation of manual training equipment in the proposed two-story and basement addition at the Jefferson High School, estimated to cost $350,000, for which bids will soon be asked on a general contract. Walter Scholer, Painters' & Decorators' Building, is architect.

The special market committee of the City Council, Indianapolis, Roy Shaneberger, chairman, plans the installation of an ice plant and refrigerating system in a proposed two-story public market in the vicinity of Tomlinson Hall. The complete project is estimated to cost about $1,000,000.

The Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, is said to have preliminary plans under way for extensions and improvements in its refinery at Gary, Ind., estimated to cost $100,000 with equipment, work to begin during the summer.

A manual training department will be installed in the new school to be constructed by the Board of School Trustees, Monticello, Ind., estimated to cost $85,000. Samuel Young, Monticello, is architect.

The Knox Consolidated Coal Co., Vincennes, Ind., has begun the construction of a new steel tipple at its Indian Creek mines in Knox County. Work is also in progress on the complete electrification of the Westphalia mines, to include the installation of considerable additional equipment.

The plant and business of the Marion Forged Products Co., Marion, Ind., has been acquired by the Marion State Bank, trustee for the bondholders, at a receiver's sale for $73,486.97, the amount of the mortgage on the property. The bondholders have tentative plans for a reorganization of the company and resumption of operations. The company operated at the former plant of the Western Drop Forge Co.

The Southern Indiana Gas & Electric Co., Second and Sycamore Streets, Evansville, Ind., has plans for a two-story equipment storage and distributing building with repair and mechanical departments, to cost close to $75,000. The company recently secured permission to issue preferred stock in an amount of $750,000, a portion of the proceeds to be used for extensions and improvements.

The Josam Mfg. Co., Euclid Building, Cleveland, manufacturer of pipe, pipe unions, etc., has asked bids on a general contract for a one-story addition to its foundry at Michigan City, Ind., 130 x 160 ft., to cost close to $50,000.

Pacific Coast

SAN FRANCISCO, May 12.

CONTRACT has been let by the Pioneer Rubber Co., 353 Sacramento Street, San Francisco, to Anton Johnson, 74 New Montgomery Street, for a one-story mill, 60 x 75 ft., at Pittsburg, Cal., to cost approximately $100,000 with equipment. B. G. McDougall, company address, is architect.

E. M. Frasier, Insurance Exchange Building, Los Angeles, architect, has plans for a three-story automobile service, repair and garage building on South Hope Street, to cost about $75,000 with equipment.

The Redlands Ice & Cold Storage Co., Redland, Cal., is considering tentative plans for a new cold storage and refrigerating plant in the Yucaipa Valley section, to cost in excess of $50,000 with equipment. J. S. Edwards is president.

The Southwestern Cotton Compress Co., San Diego, Cal., R. C. Hanna, president, is arranging for the construction of a new cotton concentration and compress plant on the tidelands to cost about $150,000, of which approximately $100,000 will be expended for machinery.

The Sperry Flour Co., 141 California Street, San Francisco, has plans under way for a new mill at Maywood and Fruitland Avenues, Los Angeles, to cost $250,000 with machinery.

The P. & H. Terra Cotta Co., Elma, Wash., J. M. Piggott, representative, is said to have preliminary plans for a new works to cost close to $50,000 with equipment.

The Oregon Pulp & Paper Co., Salem, Ore., has awarded a general contract to Cuyler Van Patten, 430 South Twenty-first Street, for construction of an addition to its pulp mill, estimated to cost $225,000 with machinery.

The American Radiator Co., San Francisco, has asked bids on a general contract for its proposed two-story factory branch and distributing plant to cost $200,000 with equipment. H. J. Brunnier, Sharon Building, is engineer. R. M. Clark is local manager. Headquarters are at 40 West Fortieth Street, New York.

The Charles R. McCormick Lumber Co., Port Angeles, Wash., will proceed with the construction of a new plant for timber development at Lake Crocker, about 42 miles from the city, including machine shop, engine house for locomotives, and other mechanical structures, to cost close to $150,000 including equipment.

The Sacramento River Fishermen's Union, Pittsburg, Cal., is considering the construction of an ice-manufacturing plant and cold storage building at Vallejo, Cal., in conjunction with a proposed local packing plant. The entire project will cost about $60,000 including equipment.

The California Fruit Wrapping Mills, Inc., Pomona, Cal., care of R. L. Knox, secretary of the San Antonio Fruit Growers' Exchange, Pomona, recently organized, is completing plans for a new factory for the manufacture of paper products for wrapping citrus fruits. It is estimated to cost in excess of $70,000 with equipment. Eric Fernstrom is head.

Canada

TORONTO, May 17.

MACHINE tool business remains steady with a good demand reported from companies other than those engaged in the automotive industry. Small lists have appeared from some interests, but the greater part of recent sales has been for single tools of a widely diversified nature. Used and rebuilt tools are moving more freely.

It is understood that the Aluminum Co. of Canada, which placed orders with the Dominion Bridge Co. for a number of cranes for its Chute-a-Caron, Que., plant, has in view the purchase of several other cranes and the Department of Public Works, Ottawa, is expected to buy a 5-25-ton traveling crane for shipbuilding works in British Columbia.

The Spruce Falls Power & Paper Co., Ltd., Toronto, and Kapuskasing, Ont., was organized May 12, in the office of Tilley, Johnston, Thompson & Parmenter, Toronto. F. J. Sensenbrenner is president; J. H. Black, vice-president and general manager; Ernst Mahler, secretary; and J. C. Kimberly, treasurer. The company will develop hydroelectric power and build a 500-ton paper mill, 250-ton sulphite and ground wood plants at Kapuskasing and Smoky Falls, Ont. It is understood that the investment in plant, railroad and equipment will represent approximately $25,000,000.

C. M. Doolittle, Hamilton, Ont., is interested in a company which will build a steel and concrete factory at Dundas, Ont., for the manufacture of a new type of road surfacing material.

The F. L. Buchanan Co., Orillia, Ont., will build an addition to a machine shop to take care of increased work and to develop new lines.

The Quebec Southern Power Co., Montreal, has taken over the municipal power plant at St. Jerome, Que., and proposes to develop an additional 3000 hp.

The rate payers of Verdun, Que., authorized the expenditure of $15,000 on enlargements and additional equipment for an electric light plant.

Contract for the new steel structure at Bromptonville, Que., in connection with the mills there for the Brompton Pulp & Paper Co., has been awarded to the MacKinnon Steel Co., Ltd., Sherbrooke, Que., at a cost of $100,000.

The Wallace Machine Works, Ltd., Sussex, N. B., manufacturer of farm machinery, threshing machines, etc., is asking for equipment for a machine shop under construction. H. W. Wallace is purchasing agent.

The Montreal Tramways Co., Montreal, is building an addition to the St. Henry Garage, and is asking for general equipment and miscellaneous tools.

The Herbert Garage, 415 Ontario Street East, Montreal, is in the market for a bench lathe and miscellaneous tools for a repair shop. A. Herbert is interested.

The Tope Construction Co., King Street West, Hamilton, Ont., has the general contract for an addition to the coke oven plant of the By-Products Coke Ovens, Ltd., Hamilton, Ont., and the Hamilton Bridge Works Co., Ltd., Bay Street North, Hamilton, has been awarded contract for the structural steel. These contracts do not include coke ovens and equipment.

Western Canada

The West Kootenay Power & Light Co., Nelson, B. C., will start work immediately on the third unit of No. 1 power development plant at Mornington Falls. The proposed unit will develop 20,000 hp. and cost approximately $500,000.

Foreign

PLANS are maturing for the construction of two hydroelectric generating plants on the Ours River, Germany, by a company recently organized to carry out the project. Sites have been selected, one of which will be located in Germany and the other across the border in Luxemburg. The initial plants will have a rated capacity of 400,000 kw. and are estimated to cost about $14,000,000, including transmission lines to Cologne, Duren, Eteburck and Luxemburg City. About $500,000 has been arranged for preliminary work. A third hydroelectric power station with capacity of 60,000 kw. is also under advisement. The Rheinishe West-

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falische Elektrizitaets Gesellschaft, Berlin, is interested in the project and, it is said, will likely use a portion of a fund of $20,000,000 recently secured in the United States for part of the work. The American Consulate, Berlin, Col. Arthur L. Conger, military attaché, has information regarding the enterprise.

The Asiatic Electric Trading Co., Bunder Road, Karachi, India, is desirous of getting in touch with American manufacturers of armature wire, electric motor and fan equipment, fan carbons and other kindred electrical specialties.

The Anglo-Chilean Consolidated Nitrate Corporation, Coya Norte, Chile, has work under way on a new plant designed to cover about 45 acres, with machinery installation for an annual output of 350,000 tons. The works is reported to cost in excess of $5,000,000, and is slated to be ready for operation next fall. Considerable reduction machinery and power equipment will be installed. The company was formed several months ago to take over the property and other assets of the Anglo-Chilean Nitrate & Railway Co., Inc.

A company at Karihaara, Finland, has preliminary plans under way for the construction of an additional unit on local site for the production of sulphite pulp, with machinery to provide for an output of about 20,000 tons per annum. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Finland 35X. The American Consulate, Helsingfors, Finland, Emil Kekich, assistant trade commissioner, also has data regarding the project.

C. & E. Marriott & Co., Calle Sucre No. 212, Guayaquil, Ecuador, South America, manufacturers' agents, are interested in getting in touch with American manufacturers of farm lighting plants, electro-plating generators, electric hand tools, electric welding apparatus, oil engines, motors and kindred products.

Power Specialty Company Expansion

The Power Specialty Co., 111 Broadway, New York, is now in a position to provide complete steam generating units with the exception of the boiler. The company long has handled the radiant heat type of superheater, the combination superheater, the Foster economizer, water-cooled furnaces and the composite water-back for use with superstokers.

After more than a year spent in investigation, the Power Specialty Co. has purchased the Aero Pulverizer Co. Through this acquisition it can offer complete guarantees covering any boiler which the purchaser may favor, in combination with a complete water-cooled furnace of Foster engineering design, Aero unit pulverizers, Foster superheaters and economizers and Foster air heaters.

Industrial Items

Rupert A. Nourse, president Midland Co., manufacturer of iron and steel products, South Milwaukee, and John R. Criley, recently general manager of Northwestern Underwriters, Milwaukee, have formed the Nourse-Criley Meehanite Co., with headquarters in Milwaukee. The new company will promote "Meehanite metal," a new cast iron developed by Ross-Meehan Foundries, Chattanooga, Tenn. Mr. Nourse has for many years been vice-president and general manager of the Stowell Co., South Milwaukee, and is now serving on the board of directors of the American Foundrymen's Association.

The Pacific Coast Pipe Mfg. Co. of California has been organized at Los Angeles to take advantage of the growing demand for steel pipe from that section. Approximately $30,000,000 worth of pipe was shipped into Los Angeles harbor during 1923. The new company plans to put up a factory. It has a capital of $1,600,000, divided into 1,000,000 shares of common stock and 600,000 shares of preferred, each with a par value of $1. The directorate is composed of Henry G. Weyse, Robert L. Chambers, Frank Bangert, J. H. Trerise and Louis Reduck. A site covering 20 acres has been purchased in the Slauson Avenue industrial district, equipment, materials and supplies have been purchased and bids have been obtained for the construction of buildings and the installation of machinery. According to statements from the officials the payroll will start initially at $12,000 per month and about 175 men will be employed.

To round out its service to the automotive and industrial fields, Standard Steel & Bearings, Inc., Plainville, Conn., has added to the "SRB" annular ball bearing line a complete series of thrust bearings identified by the trademark "M-R-C."

Ford Motor Co. of Canada reports for five months, ended Dec. 31, net profit of $974,316, equal to $9.74 per share. For the twelve months ended July 31 last, net profits were $6,132,327, equivalent to $61.32 per share, against $3,715,691 in the previous year. Total surplus, Dec. 31, was $24,275,530.

THE LAST WORD

I HAD built up in my mind a vivid picture of the main assembly line in a famous automobile factory. Having never seen the real thing, my conception was not cramped by facts. Here, I thought, would be found the utmost economy in effort, the zenith of efficiency. Every movement would be timed to the split second.

Every face would be drawn with anxiety over the terrible consequences of delaying the whole line by an inadvertent slip of hand, foot or mind.

But the picture has been shattered. The other day I saw the famed "automobile cafeteria," and the impression it gave me was distinctly one of peace, ease and quietness. No one looked worried or hurried. Perspiration was not in evidence, and an air of gentlemanly leisure overhung all. Contrasted with my previous conception, it did not look at all unlike a slow motion picture.

Harsh reality claims as victim another illusion.

Candy and pig iron. *An incongruous pair. Yet we are told by a Chicago candy manufacturer that they have not a little in common. For instance, he says that his sales have closely paralleled pig iron output for the past several years. So he watches* THE IRON AGE *pig iron figures to get a line on the candy market.*

Our ignorance of the candy industry is so profound that we shall have to accept this with the usual grain of sodium chloride until some obliging statistician plots the candy and pig iron curves for us. Boy, page Colonel Ayres.

"A million dollars for utility but not one cent for adornment," was long the sentiment of most manufacturers with respect to factory buildings. But have you noticed the change taking place? Many of the newer factory buildings are positively handsome, and well-worthy of being called "cathedrals of industry."

One need not be a psychologist to know that dollars spent in improving the appearance of a workshop pay regular dividends in lower labor turnover and better workmanship.

In 1919, *for every closed automobile manufactured, nine open cars were produced. Six years later,* 1925, six out of every ten cars made were of the closed type.

Business must be good in the plate glass industry. But where, oh where, have the one-man tops gone?

Is it more than a coincidence that the fastest growing industrial section of the United States is practically free of labor unions, while England, far from prosperous and progressive industrially, is over-run with them?

It would not be fair to blame the plight of England wholly on the labor unions, but it has been demonstrated beyond question that the petty regulations of over-strong and over-zealous unionists are fatal to industrial progress.

From Sweden comes the news that a newly invented motor truck thrives on charcoal instead of gasoline. Most of us are fed up on "substitutes," for they usually cost several times as much as the real thing. But this particular substitute is said to be cheaper. Question: If the 18 *million cars in this country were on a charcoal diet, how long would our fast disappearing forests last? Looks as though the oil industry were safe for a time.* A. H. D.